Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

VOL. IX.—NO. 9. (NEW SERIES.) | NEW YORK, AUGUST 29, 1863. | SINGLE COPIES SIX CENTS. $3 PER ANNUM—IN ADVANCE

Improved Flying Machine.

When mankind are able to travel through the air in any direction, it will be due to the ingenuity of inventors in overcoming natural objects. What these obstacles are, most intelligent persons already know. The idea of soaring above the heads of the multitude, and of traversing the trackless wastes of the atmosphere, is so fascinating, both to the inventor and the enthusiast, that it is no wonder that each should anticipate the pleasures to be derived from it, and ponder upon its advantages as well. From Roger Bacon, a philosopher of the year 1300, down to experimentalists of the present day, each and all have been busy in devising plans and machinery wherewith to sail through the air as swiftly and as safely as birds. Some theorists (for as yet the art of travelling in balloons is practically a theory, to speak paradoxically), are content with merely inflating a sphere, and allowing it to be borne by currents of air, which they maintain exist at certain altitudes, and which blow as the Gulf stream flows—in one direction, at certain seasons of the year. Other persons, however, not content with this method of aerial progression, fitted their balloons with machinery, which, acting on fans or vanes, inclined at certain angles with the side or at the stern of the balloon, was intended to impel the same through the air at a rate of speed impossible to achieve on land. At the present writing we cannot recall any instance, on indisputable authority, where such contrivances have succeeded.

The failures, however, may have been owing to defective apparatus, or a want of scientific knowledge; without which the most sanguine æronant must inevitably fail. The aerial car herewith illustrated, is not, strictly speaking, a balloon; but is an elongated conoidal cylinder, A, having machinery for its operation and propulsion through the air, contained in a car, B, in the lower part of the cylinder. The frame of the cylinder itself is constructed of split rattan, woven in the same manner as a chair bottom, and having the ends of the rattans joined in a rope which runs fore and aft the machine. Outside of this frame there is a covering of silk, as in other balloons. On the platform, B, is placed the propelling machinery, which consists of a cylinder fitted up in all respects similar to a steam engine, having a piston which reciprocates up and down, through the medium of the valves contained in pipes, a. This engine is to be driven by compressed hydrogen gas, generated for the purpose in the vessel, C. The gas is exhausted into the condenser, D, after it has passed through the engine and moved the piston. This engine drives the fan wheels, E, contained in either end of the balloon, the fans of which are set in gas-tight drums, G, filled with hydrogen gas; the whole being driven through belts or other agents suitable for the purpose. The office of these fans, as the reader has doubtless discovered ere this, is to forcibly expel air through the tubes, H H, to the rear of the balloon, and in this manner propel it through the air, in the same way that a rocket travels; indeed it will be seen that this is the idea upon which the inventor has worked, the form of the machine being similar to that of the projectile mentioned. A steering wheel, I, is connected to a rudder, J, at the stern, and it is claimed that by this means the direction of the machine can be altered at will. Fig. 2, is a plan view of the engine, generator, condenser, &c., in which similar letters refer to like parts. The inventor's plans with reference to his scheme are very fully set forth in our advertising columns. It will be seen, on referring thereto, that he proposes to revolutionize the present method of communicating between distant points; and to completely annihilate time and space. If he accomplishes a tithe of what he expects to, he will be a benefactor of his race. This aerial machine was patented through the Scientific American Patent Agency, on June 3, 1862, by Arthur Kinsella, of Cascades, Washington Territory; further information respecting it can be had by addressing him at that place.

Fig. 1

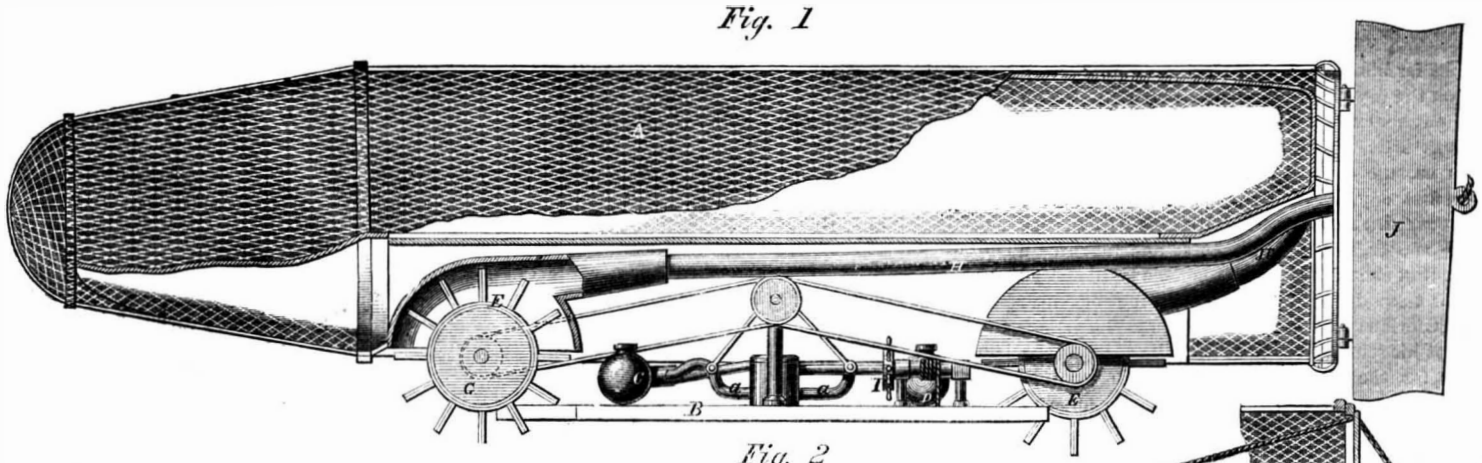
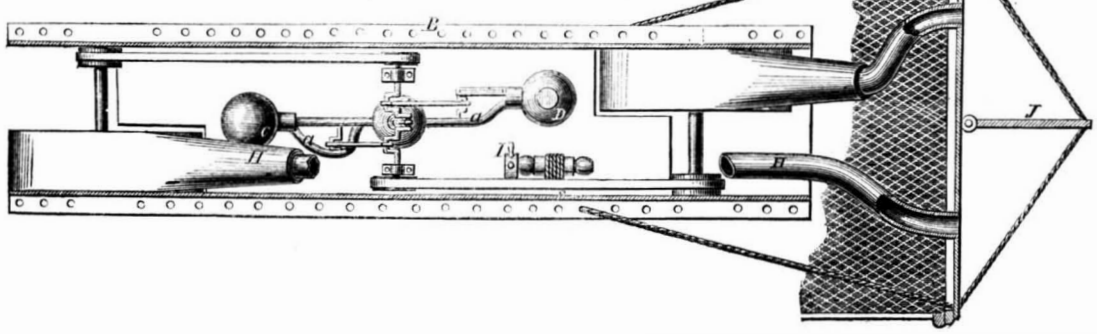


Fig. 2



KINSELLA'S PATENT AERIAL CAR.

New Rifled Gun.

It is claimed that the Ferris gun, a newly invented weapon, gave a speed of 2,200 feet per second to its shot, as measured by the electrobalist at West Point. The gun was tried in the presence of numerous officers of high standing in the army. The highest velocity ever obtained before was with a Parrott gun, the speed of the projectile from which was 1,800 feet per second. The Ferris gun obtained its high velocity from the quantity of powder burned in it, which is, in a $1\frac{3}{4}$-inch bore, 24 ounces, while the shot weighs 40 ounces—rather more than half the weight of the shot. At this rate the 100-pounder would require 60 pounds of powder, and the 200-pounder nearly 100 pounds—a fearful charge, certainly.

PROPOSAL TO THE GOVERNMENT.—Horatio Ames, of Falls Village, Conn., proposes to make for the Government fifty 300-pound rifled cannon, to carry a 100-pound charge of powder; price of the weapon $1 per pound. The guns are intended to be nearly 10 inches bore, and weigh 30,000 pounds a-piece. They are intended to stand 1,000 rounds without bursting. We presume there are a great many forges willing to make such guns on similar terms.

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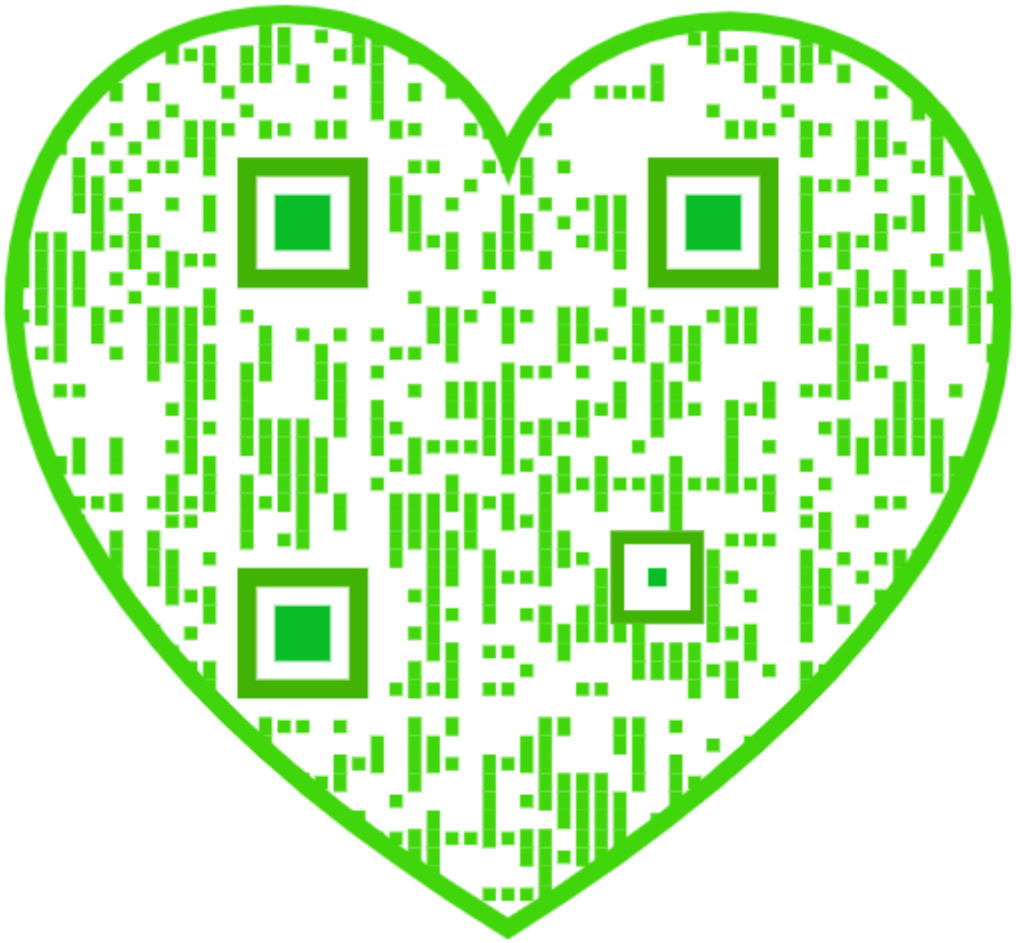

What Patience and Energy can Accomplish.

The following narrative is valuable, not alone for the entertainment it affords the reader; but as an evidence of what may be done in the world by a determined, patient man. Young men who think the world owes them a living, should cast about in every direction, and make the world pay its debts in a legitimate way; and they may have the satisfaction of becoming as wealthy as the hero of the sketch. It is a true story.

Once upon a time there was an old soldier, and he is alive yet, named Chapellier. Discharged and poor, he had made it his business to live by what he could find in the gutters of the streets of Paris—horse-shoe nails, on lucky days perhaps even a horse-shoe—iron toughened by much tramping, dear to the gun-maker—poor scraps that, with help from odd street jobs in opening carriage doors and so forth, enabled him to support life. But he sought advancement, and soared from this calling into the service of a wholesale chiffonier, whose baskets he sorted, and in whose warehouses he arranged the stores, till he fell sick, overpowered by the smell of the articles in which his master traded, and went into the hospital. When he came out he hired himself to a poultry merchant, and earned forty sous a day by filling his own mouth with peas, and then putting them out of his mouth down the young pigeons' throats, to fatten them suddenly. But while here he thought on the fact that a poultry merchant did not get the full price for his birds, unless they were sold fresh killed on the day of their arrival. However sweet a bird might be, every cook saw at a glance whether it was fresh killed. How was that, he inquired. Oh, that is because the feet that are brilliant and black at the first day, become grayer and duller at every day afterward. The wise Chapellier having reflected on this matter, made experiments, and invented a varnish that should keep the birds' legs brilliant and black for many days. There was a stir in the poultry trade. Glorious was the invention, and Chapellier, who kept his secret, went about painting the feet of poultry for the fee of twelve and a half per cent, upon all sales of second day's stock. So he made money, but it was as an itinerant professor. His desire was to be the head of an establishment. He retired, therefore, from the claw-painting business; having sold his secret and connection in the trade for forty pounds, to a friend who has since made a fortune by it.

What should he do? Would his old master the chiffonier, take him into partnership? He would go and ask. He went and asked. Not without a premium of two thousand pounds. Chapellier could not afford that; but while he was in the warehouse he was struck by the great number of unsaleable pieces of waste bread brought in the baskets of the rubbish hunters. Here was an idea—and this is the lesson for your cook and for your children. This great man went out and bought a donkey and a cart, and having hired a large room, went with his donkey-cart to all the cooks of schools and colleges and large establishments, to propose a purchase from them of all the stale scraps of bread they had been used to throw into the street. They cordially hailed the idea of a new perquisite. Chapellier then bargained with the scullions of the eating houses, and with all the chief cooks of the city, that he might have the dry crust and scrap, destined to be thrown into the street. He also contracted with the scavengers for all the bread they found, in dust holes and gutters.

Having secured his monopoly, this laudable person took his stand one morning in the middle of the chief market of Paris, with a placard on his hat inscribed, "Bread crusts for sale." The Parisian keeps rabbits; and the rabbits require bread as well as cabbage; the chickens fed for market, also require bread crumbs. Many domestic pets of the wealthy are, in Paris, denied meat; and so, from one source and another, came a large demand for bread crusts, sold at three cents a basket full. In four months he had three horses and three wagons to work. In a few years, he sold his business, and retired with a competence. But it was only to come back in a month or two. Refinement on his old idea had occurred to him, and he could not rest until he worked it out. He had seen enough of cooks and sausage-makers to observe the value of bread-crumbs, for strewing over cutlets, and for other purposes. Bread crumbs made of stale bread, pounded and grated, fetched fourpence per heaped quart. He would turn his stale bread into bread crumbs, and sell that at threepence per the heaped quart. It was rather hard on his successor, to be sure, who was ruined in the trade he had bought. But what was to be said? Bread crumbs are not crusts, and Chapellier was a great creature. As manufacturer of bread crumbs, then, a mighty trade was driven. But the bread of which the crumbs were made was some good and some bad. It would not pay to separate the good from bad, but it would pay to establish ovens, and sell the crusts, baked in lumps or grated for the use of cooks, as "croutes au pot." Except the best houses, these preserved scraps find their way into almost every Parisian's dish. The burnt bits and scrapings are pounded and sifted to be sold to the perfumers, who will make them into tooth-powder. And thus the Pere Chapellier made his fortune. Now, my good (or bad, as the case may be) cook, and my dear children, you observe that a large fortune is to be made by dry crusts and mouldy scraps of bread, and yet you throw them away!—*All the Year Round.*

Colored Light and the Eye.

The following speculations on light are by B. S. Barnard, in the *Photographic News* (London):—

"'As white as fine linen,' 'as white as snow,' are frequent comparisons; but they are all dull examples as compared to many chemical precipitates. Precipitated chalk far outshines the natural varieties, and fine qualities of magnesia carbonate surpass this. Microscopic examination indicates that this latter consists of particles, clear and colorless, but very minute. White lead consists of particles equally minute and also transparent, but of a yellow brown color by transmitted light; consequently, when seen in bulk it appears of a less pure white. But magnesia cannot be used as a pigment because it possesses no body; and the difference between the white lead and the magnesia in this respect depends upon the different refractive powers of the individual particles which compose the separate powders. They are both transparent in their individual particles, but the magnesia is more so. They are both bodies possessed of considerable refractive power, but the lead is more so. When air intervenes between their particles the reflective power of both so much exceeds that of air, that they are highly reflecting and very slightly transmitting; but the less absorbing power of the magnesia makes it the whitest—the more reflecting of the two. But when oil intervenes, as would be the case if they were used for pigments, the refractive power of the magnesia so nearly coincides with that of the oil, that much transmission and little reflection is the result, and this constitutes what painters call want of body. But the lead so greatly exceeds the oil in refracting power that its reflective property is not much interfered with, and even with its greater absorbing power it reflects much and transmits little light; and this is what painters call great body.

"The length of an undulation of violet light is seventeen millionths of an inch; the red undulation is twenty-six millionths; undulations longer or shorter than these not being visible. Again, the length of the light wave varies in the medium. An undulation in air measuring four will measure only two and a half when it enters glass, and will again elongate to its former measure on its exit. When an undulation passes from air into water, or into the humors of the eye it likewise becomes shortened. If we say that luminous undulations, which in air measure twenty-two millionths of an inch, look yellow when they enter the eye (that being the wave length belonging to what we call yellow light), we must also remember that they measure one-third less in that organ in consequence of its refracting power. We then come to the singular conclusion that the blue sky is yellow, sunshine is red, and the rosy tints of evening are not luminous at all till they enter the eye. If the color depends upon the length of the light wave, and the length of the wave depends upon the refracting power of the medium through which it is passing, every beam of light changes color; red it may be on passing through the region of the stars, yellow or green it may be when it enters our earth's atmosphere, blue or violet when it enters water, non-luminous as it passes through glass. But if light, which we perceive as violet while it exists in the aqueous humor of the eye, was red originally, what color must that light be which we perceive is red? Its undulations in air must be too long to be luminous at all. This introduces us to the solemn thought that all this vast universe is dark! Light only exists in the eye. It is only a sensation—a perception of that which in nature exists as a force capable of producing a sensation."

Adulterated Bread.

What with alum in the flour, and pipe-clay in the yeast, the staff of life eaten by the English must be a highly nutritious diet. The *Grocer* has the following paragraph in relation to recent discoveries in the adulteration of imported yeast:—

"Dr. Letheby informed the court of the steps taken by the authorities at Hull, and he added that, on making an analysis of six samples, of about 7,800 lbs. of the yeast, it was found that the proportion of pipe-clay in the dry yeast ranged from 23 to 36 per cent. Dr. Letheby further said it appeared that 3,733 tuns of yeast were annually imported into Hull from Schiedam, and that the total importation of yeast from Holland into the ports of Hull, London and Newcastle amounts in value, every year, to about £177,000 sterling. Most, if not the whole of the yeast, was used in the preparation of bread and confectionery. It was, therefore, of the utmost importance that the quality of the yeast should be maintained as pure as possible; for, independently of the fact that pipe-clay might of itself be hurtful to the human body, when taken for any time, the admixture of clay with the yeast hides its putrefactive changes, and so produces a very acid and unwholesome loaf. Again, as the pipe-clay contained a large proportion of alumina, which was the matter sought for by the chemist in analysing bread for alum, it was very probable that a baker using such adulterated yeast in the preparation of bread, might be exposed, under the Adulteration of Food Act, to a false charge of having adulterated his bread. The quantity of German yeast used in the fermentation of bread was about three pounds to a sack of flour; and this would give nearly half an ounce of yeast to every loaf, the pipe-clay in which was sufficient to be a cause of alarm.

Files Made by Machinery.

The manufacture of files, by machinery, as we learn from *The Ironmonger*, has been commenced in Birmingham, England. The blanks are forged by machinery, and they are then cut with the French machine of M. Bernot. The machine, which is very compact, resembles a small steam hammer in its general appearance. It is provided with a vertical slide, carrying a chisel on the lower end. The top of this slide is pressed by a flat spring, which is governed by a cam mounted upon a shaft, and actuated by a ratchet wheel and pawl; and thus the strength of the blow of the chisel is regulated to the varying breadth of the file. A projection at the other end of the slide comes in contact with a cam upon the driving shaft of the machine, and so sets the machine in motion. The blank to be cut is placed upon a traveling slide, which rests upon a semi-circular bed, which is mounted in trunnions resting upon swivelling journals, so that the surface of the blank can be presented at the desired angle to the chisel. The blank is held parallel to the edge of the chisel by means of a weighted "leveler." All being ready, the file is fixed in the bed, the machine is set in motion, and presently the file runs out cut. The chisel makes from 800 to 1,500 cuts per minute, and will produce about five or six times the amount of work which can be supplied by hand-cutting. A comparison of the two modes of cutting—hand and machinery—shows that, while a machine, to cut 14-inch hard files, makes 1,000 cuts per minute, or 600,000 cuts per day, a good file-cutter, upon the same size and description, could only make 140 cuts per minute, or 84,000 per day.

THE commutation money paid by those drafted throughout the country, will amount, it is supposed, to some forty or fifty millions of dollars. The U. S. Collector at Lancaster, Pa., has received $79,000, and exempted 265 men in consequence.

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The Big Gun at Charleston---What it Can Do.

The breaching power of the 10-inch 300-pounder Parrott rifled gun, now about to be used against the brick walls of Fort Sumter, will be best understood by comparing it with the ordinary 24 pounder siege gun, which was the largest gun employed for breaching fortifications during the Italian war.

A 24-pounder round shot, which starts with a velocity of 1,635 feet per second, strikes an object at the distance of 3,500 yards with a velocity of about 300 feet per second.

The 10-inch rifle 300-pound shot has an initial velocity of 1,111 feet, and has afterwards a remaining velocity of 700 feet per second at a distance of 3,500 yards.

From well-known mechanical laws, the resistance which these projectiles are capable of overcoming is equal to 33,750 pounds and 1,914,150 pounds raised one foot in a second respectively. Making allowance for the difference of the diameters of these projectiles, it will be found that their penetrating power will be as 1 to 19.6.

The penetration of the 24-pounder shot at 3,500 yards, in brick work, is 42 inches. The penetration of the 10 inch projectile will therefore be between six and seven feet into the same material.

To use a more familiar illustration—the power of the 10-inch rifle shot at the distance of 3,500 yards may be said to be equal to that of the united blows of 200 sledge hammers weighing 100 pounds each, falling from a hight of ten feet and acting upon a drill ten inches in diameter.

[The above is from the Washington *Republic*. We do not see the force of comparing the 10-inch gun with the common 24-pounder, used in the Italian war, respecting which no satisfactory information is given; whereas there is a published account of the breaching effect of rifled cannon in Captain Benton's "ordnance and gunnery." He states that Armstrong rifled guns were tried against a martello tower 30 feet in hight and 48 feet in diameter, having walls from 7 feet 3 inches to 10 feet thick, of solid brick masonry. The distance of firing from the tower was 1,032 yards. The 80 pound shot from the rifled gun passed completely through this brick masonry (7 feet 3 inches), and 100-pounder percussion shells lodged in the brick-work at a depth of 5 feet. After firing 170 projectiles, a small portion of which were shells, the entire land side of the tower was thrown down. This is positive data respecting the penetrating power of rifled guns against brick masonry; and General Gilmore, at the siege of Fort Pulaski, demonstrated in actual warfare the superior penetrating power of rifle projectiles.

The comparison of the concentrated blow of one hundred hammers, each weighing 100 pounds, falling 10 feet, and a shot of 300 pounds having a velocity of 700 feet per second, appears to be inconsistent. The expression representing the penetrating power of shot is velocity squared, multiplied by weight. The quantity of mechanical work stored up in a 300-pound shot moving with a velocity of 700 feet per second, measured in pounds lifted one foot high, is $w\,v^2 \div 2\,g$ (weight multiplied into the square of the velocity, divided by the action of gravity). Thus $300 \times 700^2 \div 64$ (action of gravity on velocity)—$= 2{,}296{,}875$ pounds lifted one foot. The velocity with which a hammer strikes after falling 10 feet is 25.28 feet per second; and the whole concentrated power of 200 sledge hammers, each weighing 100 pounds, falling from a hight of 10 feet, is equal to 200,000 pounds lifted one foot.

Photo-lithography.

A communication has been read before the Academy of Sciences, Paris, from M. Meorvan, in which he describes his method for obtaining direct photographic impressions upon stone, which he can afterwards print off. He first gives the stone a coating, applied in the dark, of a varnish composed of albumen and bi-chromate of ammonia. Upon this he lays the right side of the image to be reproduced, whether it be on glass, canvas or paper, provided it be somewhat transparent. This done, he exposes the whole to the action of light, for a space of time varying between 30 seconds and 3 minutes, if in the sun; and between 10 and 25 minutes, if in the shade. He then takes off the original image, and washes his stone, first with soap and water, and then with pure water only, and immediately after inks it with the usual inking roller. The image is already fixed, for it begins to show itself in black on a white ground. He now applies gum water, lets the stone dry, which is done in a few minutes, and the operation is complete; copies may at once be struck off by the common lithographic process. The varnish has been fixed and rendered insoluble by the action of light wherever it could penetrate; but all the parts of the varnish protected by the dark portions of the image still retain their solubility, and are removed by the soap.

Proper Time and Mode for Cutting Flowers.

The Irish Country Gentleman's Journal says:—"Those who wish to retain the beauty and perfume of their cut flowers would do well to take the following advice:—Never cut your flowers during the intense sunshine, nor keep them exposed to the sun or wind; do not collect them in large bundles, nor tie them tightly together, as this hastens their decay. Do not pull them, but cut them cleanly off the plant with a sharp knife, not with a pair of scissors. When taken indoors, place them in the shade, and reduce them to the required length of stock with a sharp knife, by which means the tubes through which they draw up the water are left open, and the water is permitted to ascend freely, whereas if the stems are bruised or lacerated, these pores are closed up. Use pure water to set them in, or pure white sand in a state of saturation, sticking the ends of the stalks in it, but not in a crowded manner. If in water alone, it ought to be changed daily, and a thin slice should be cut off the ends of the stalks at every change of water. Water about milk-warm, or containing a small quantity of camphor dissolved in spirits of wine, will often revive flowers that have begun to fade. Place a glass shade over them during the night, or indeed at all such times as they are not purposely exhibited. Shade them from very bright sunshine, and when uncovered, set them where they may not be exposed to a draught of air. A cool temperature during the summer is favorable for them, and the removal of the slightest symptoms of decay is necessary. When carried to a distance, carry them in a shallow air-tight tin case, or cover them with paper to exclude them from air and light. Charcoal saturated with water is also a good media to stick them in, and the thinner they are kept the better."

Economy in a Family,

There is nothing which goes so far toward placing young people beyond the reach of poverty as economy in the management of household affairs. It matters not whether a man furnishes little or much for his family, if there is a continual leakage in his kitchen or parlor; it runs away he knows not how, and that demon Waste cries, More! like the horse-leech's daughter, until he that provided has no more to give. It is the husband's duty to bring into the house; and it is the duty of the wife to see that none goes wrongfully out of it. A man gets a wife to look after his affairs, and to assist him in his journey through life; to educate and prepare their children for a proper station in life, and not to dissipate his property. The husband's interest should be the wife's care, and her greatest ambition to carry her no farther than his welfare or happiness, together with that of her children! This should be her sole aim, and the theater of her exploits in the bosom of her family, where she may do as much towards making a fortune as he can in the counting-room or the workshop.

It is not the money earned that makes a man wealthy—it is what he saves from his earnings. Self-gratification in dress, or indulgence in appetite, or more company than his purse can well entertain, are equally pernicious. The first adds vanity to extravagance; the second fastens a doctor's bill to a long butcher's account; and the latter brings intemperance—the worst of all evils—in its train.

Cultivation of Cabbage.

This valuable esculent may be brought to table in good condition nearly the whole of the year round, by planting from a series of monthly sowings, extending from early in March to the end of August. The largest sowing, however, requires to be made on or about the 12th July, from which the spring supply is produced; those which are sown previous to that date form heads the same year, and produce a succession of nice young cabbages far on into the winter. The August sowing is to furnish plants to be pricked into a nursery bed and planted in a bed in March, to succeed the autumn planted bed, which should be rooted up as soon as the produce is cut. In this manner, by making small beds at proper intervals, removing the old beds as soon as the first produce is cut, and cropping the ground with a different vegetable, the fertility of the ground is retained. The whole family are terrible suckers of the soil, and hence arises the necessity for affording them, a liberal supply of manure strength.

Cabbages like a strong soil, which, when prepared for planting, should be well manured and deeply trenched; and to ensure a free growth and consequent succulent tender quality during the hot months, they should be roughly hoed up, and liberal supplies of liquid manure poured over them; in the cooler months of the year this will not be necessary, provided there is plenty of stimulation from beneath. Very light and sandy soil will require even more attention to be paid to the manuring part of the question than strong soil, and will not produce tender fine-flavored cabbages without a good supply, and many applications in a liquid state.

About Ginger.

This is the root, or rather the underground stem, of a plant which is a native of the East Indies; but is now grown in many other tropical countries. The stem grows two or three feet high, and is reed-like; the flowers are borne on a separate stalk, of a dark purple color, and appear from between broad scales. Our supply comes from both the East and West Indies; and is imported in the root, which differs much in appearance and quality. When scalded as soon as it is taken up, and dried in the sun, it has a dark brownish color; but if the root is scraped before it is dried, it is much lighter in appearance. Some of the finer kinds are not only scraped but bleached, and are known as white ginger. The root is retailed in powder, and in the grinding is frequently adulterated with meal and similar substances; several grades of ginger being kept at the wholesale stores at prices corresponding to the amount of adulteration. The preserved ginger, which is brought in jars from China, is prepared from the young and tender roots, before they have become stringy, or have acquired a very powerful pungency. The fresh root is imported from the West Indies, and is frequently sold in cities for the purpose of flavoring citron, melon, and other preserves. These fresh roots, which are usually brought in the Fall, may be planted in a pot and kept through the Winter, and in the Summer turned out into a warm place in the garden, where they will flourish during hot weather.

MACAROONS.—These little cakes are much admired, and are a very agreeable addition to the dessert. The following is a receipt for preparing them:—"To a quarter of a pound of sweet almonds, take four tea spoonsfull of orange-flower water, the whites of six eggs, and one pound of sifted white sugar. Blanch the almonds (remove the brown skin), and pound them with the orange flower water, or some of the white of an egg; then whisk the whites of the eggs and add them gently to the almonds. It is important that these two ingredients should be carefully added, or they will 'oil' or separate. Sift the sugar into the mixture until the whole forms a paste, not too stiff to drop upon white paper, which should be placed in a tin, or on a plate, and the whole baked in a slow oven till done.

REMEDY FOR SMALLPOX.—The Surgeon-Major of the Royal Horse Guards writes to the London *Times*, that the root of the pitcher plant is a specific for this disease. An ounce of the root is sliced, infused in a quart of water, allowed to simmer down to a pint, and given in two table spoonsfull doses every four hours, while the patient is well nourished with beef tea and arrowroot.

FREAK OF LIGHTNING.—The factory of Keith and Packard, in North Bridgewater, Mass., was lately struck, but no material damage done. A workman, who was carrying a bar of iron on his shoulder, was prostrated and his overalls torn to shreds, yet he received no personal injury.

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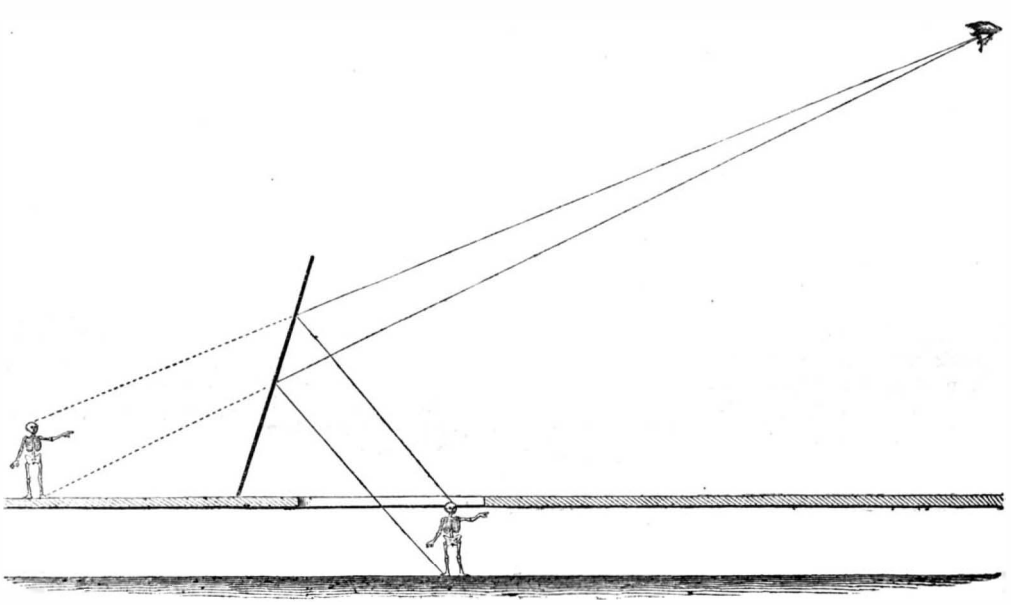
CORRECT EXPLANATION OF THE GHOST.

The great novelty in the theatrical world is the GHOST. Wallack's theater is crowded nightly by hundreds of our citizens to witness this truly wonderful and startling apparition.

An actor in the character of a murderer is seen asleep on a lounge in the rear of the stage, which is dimly lighted. Presently he rises in his sleep and begins to rave under the tortures of remorse for his crime. Instantly there appears at his side a bright image of a skeleton, so luminous that it sheds some light upon the obscurity around. Though startlingly distinct, it is seen to be only the image of a skeleton, as objects on the stage are visible directly through the bones. The murderer strikes his sword through the grizzly horror, but it is as impalpable as air. After a brief space the apparition vanishes as suddenly as it came. It makes no movement up or down or to either hand, but simply disappears.

Some of our cotemporaries have published explanations of the mode in which this wonderful optical illusion is produced; but, so far as we know, none of them, have given the correct explanation. This we are now enabled to give, on the authority of one of our learned professors.

The plan is exceedingly simple. A very large plate of transparent glass is set at an angle on the stage in front of the actors; an opening is made through the floor of the stage in front of the glass, and the skeleton is placed beneath the floor in front of the opening. As soon as a strong light is thrown upon the skeleton the light passes upward through the opening in the floor, and is reflected from the glass, producing an image in the rear. The glass is an invisible mirror, producing its image directly among the actors who are seen through it.



REPORT ON ARMSTRONG GUNS.

A select committee appointed by the House of Commons (England), "to inquire into the expenditure incurred since 1858, on various kinds of improved ordnance obtained by contract, and made at Government risks; also to inquire into the results obtained by such expenditure," has lately made a very full report. It is stated that Sir William Armstrong first brought his gun to the notice of the Government in 1854; and an order was then given for six trial guns, varying in size from 3 to 18-pounders. The reports of the officers employed to inspect them were favorable, and Lord Panmure declared, in reference to the 18-pounder, that "for all purposes of projection and accuracy of flight of the projectiles the experiments were conclusive." It was not, however, till 1858, that the idea of providing rifled ordnance for field service on a large scale was entertained by the War Office. In that year General Peel appointed a special committee to advise him on the whole subject, and this committee decided that, having regard to expense, the competition for the patronage of Government should be limited to the Whitworth and Armstrong guns. The latter was ultimately selected as the "field gun of the service." In 1859 Sir William Armstrong was appointed engineer of rifled ordnance, and superintended the ordnance works at Elswick, erected by a company of which he was a partner.

The British Government has paid £1,067,794 (about $5,339,000), for guns, projectiles, &c., to this company; and the contract has been terminated. The sum of £1,471,753 has also been expended for guns, carriages, and ammunition, at the Woolwich Arsenal, making a total of no less than £2,539,547 (about $12,697,000), expended for Armstrong guns and their appendages, in about two and a half years. The choice of the Armstrong gun for military service is ratified by the committee. They admit that experiments with the Whitworth gun were "not of so extended a character" as those with its rival, but they give as a reason for this that at that time Mr. Whitworth had no system of his own for the construction of guns. "He had only rifled Government blocks of brass and cast-iron." Sir William Armstrong, on the contrary, had a complete method, capable of fulfilling the prescribed conditions, and the committee deny that, either then or now, any practical evidence was or is produced to show that any other method can be compared to it. The characteristic peculiarity of it they consider to consist in a "definite combination of construction, breech-loading, rifling, and coating the projectiles with soft metal;" and they are of opinion that its adoption in 1858 was "fully justified." With respect to the introduction of Armstrong 40-pounders and 100-pounders into the navy, the committee express a more qualified opinion. This was commenced in 1859, on the advice of Captain Hewlett, of the *Excellent*, a gunnery vessel. It is stated in the report that the old 68-pounder, at a distance of 200 yards, is superior, as a broadside gun, to a 100-pounder Armstrong, and the 60-pounder is considered the most effective gun in the service for piercing iron plates. About 3,000 Armstrong guns, altogether, have been constructed, of which number 570 of the 12-pounder class have been in service; and out of the entire number not one has yet exploded. Recently Sir William Armstrong has made some 600-pounders, but the results of trials with them are not given. Some statements had been published respecting the inefficiency of the breech-loader field pieces used in China. These assertions are contradicted. No difficulty was found in keeping them in perfect order under all circumstances, and their range and accuracy were unequalled. But for large guns, movable breeches are condemned and muzzle-loaders preferred.

One part of the report puzzles us. It is stated therein, that the old 68-pounder is the most effective gun against iron plates; and the London *Times* dwells upon this as a prominent fact. And yet not long ago it was reported in the English journals that the Whitworth, Armstrong, and Horsfall guns, penetrated and smashed targets, at Shoeburyness, that were perfectly invulnerable to the efforts of the old 68-pounders.

Yosemite Valley—California Scenery.

The scenery in some parts of California is grand and sublime, far surpassing that among the mountains on the Atlantic coast range. The following are extracts from a communication in the San Francisco *Bulletin*, by a lady who had visited the valley of Yosemite, to see its giant cliffs and wonderful waterfalls:—

"The descent into the valley is frightful—the pathway so steep in many places as to be absolutely precipitous. For miles we pursued this perilous way, unwilling to stop, and yet half afraid to go on. There are many places where a false step, a broken girth, a restive horse, or a dizzy brain, would have sent us into eternity. Fortunately for us we reached the valley in safety. Our party halted for a few moments on the bank of the Merced river, that our guide might adjust our saddles, our horses rest awhile, we regain our composure, and take breath after our rapid and exciting ride. It was a scene for an artist. The river flowing at our feet—a noble stream, clear, deep, and rapid; the tall pines rising majestically above us, their thick shadows turning aside the slanting sunbeams, or breaking them in checkers of golden light, the horses quietly cropping the rich grass. The grouping of the party was in itself artistic. While some were stretching themselves at full length under the trees, others were drinking from the stream, or, leaning idly upon their saddles, looking up at the towering cliffs which rose solemnly and sublimely all around, completely isolating us from the world and shutting us up within a wall of adamant 4,000 feet in hight! Down the valley the river came, winding its way like a huge serpent, its silver scales glistening in the sunlight. The light winds chased the shadows over the waving grass, which grew tall and even, like a field of grain. Opposite, down the giant wall, the delicate Pohono threw its bridal veil in misty wreaths, 900 feet into the valley; and from afar the sound of falling waters from half-a-dozen cataracts came to us on the breeze, like the breaking of the surf upon a rock-bound shore.

"In a little while we were safely landed on the opposite bank and cantering gaily up the valley. As we advanced, cliff after cliff loomed grandly before us, each one looking larger than the last, until the white walls of Tutochanoola rose sternly and solemnly before us. Words cannot paint the sublimity of this giant crag; no artist can do it justice. We rode under its shadow for miles, and it seemed no nearer and no further off. Turn which way we would, there it stood frowning down upon us threateningly, grim and white, like destiny itself. It is an event in one's life to have looked upon a sight like this. The Sentinel Rock is a sharp gray peak towering up above its fellows, like a watch-tower, on this giant wall. The Three Brothers are stupendous, and their great domes seem to prop the very sky. But wonderful as they are, and past all description, they do not impress one like El Capitan. After a ride of forty miles we at last arrived at the Yosemite Hotel—a house very pleasantly situated within a few yards of the river, in the midst of a magnificent forest, directly opposite the falls of the Yosemite. Tired as we were, we could not resist the temptation of lingering at the door to look at this beautiful fall, or rather succession of falls, for there are three in number, making in all 2,500 feet of descent. It looks like myriads of water rockets (if one can imagine such a thing) bursting into foam, waving and fluttering in the wind. It looks like anything but water; it is more like some long, white, flowing garment—some snowy descended drapery, as if an angel had dropped its mantle in its upward flight. There was a fascination about it which charmed us to look at and listen to its solemn anthem, as it rose high and clear above all other sounds, like the voice of some mighty organ. It is unfortunate for the dusty, weary pilgrim, that the waters of the Merced are too cold for bathing, for after such a journey there is no luxury which could be so acceptable as a bath. The water is so beautifully clear, and the soft white sand at the bottom of the river gleams so temptingly, that it is difficult to resist the impulse to plunge in.

"We spent our first day in the valley, sight-seeing in a small way. We visited the falls of the Yosemite, and afterward rode several miles up the valley to visit two little lakes, picturesquely situated in a

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little nook surrounded by giant cliffs. Fine trees and overhanging shrubbery grow upon their banks. The deep, clear waters look darkly blue, and an indescribable serenity rests upon the scene—a sort of Sabbath silence, as if Nature was at her devotions, and not to be disturbed by worldly cares. These lakelets are full of speckled trout, some of them of great size. They are often taken of the weight of three pounds. We also visited the Vernal and Nevada falls in the valley. After riding a couple of miles, we dismounted and followed our guide along a blind pathway, over rocks, through thickets, and across streams for two miles further, until we entered the deep ravine into which the Vernal fall precipitates itself. There the trail ascends a narrow ledge, which seams the face of the mountain, at a frightful distance above the mad whirling river below. The pathway is very steep, very narrow, and not without danger. We stood upon the very verge of the cataract in perfect safety. The table-land through which the river rushes after its first great leap—the Nevada falls—until it takes its final plunge over the Vernal fall, is the wildest and most desolate region one can imagine. It looks as if a hurricane had swept over it at no remote period. The mountain sides are verdureless and bare, and not a living thing, bird or beast, or sound, but of the cataract, greets the eye or ear of the adventurous tourist. All is silence and desolation. A few dwarfed manzanitas have found root among the rocks, and we saw occasional clusters of the Alpine rose and a few fine portulaccas, covered with fragrant yellow blossoms. The river is something fearful, as it dashes furiously along its rocky channel, whirling and eddying, and leaping in fierce fury. Around and below, on every side of us were giant cliffs, huge domes, and great rugged rocks lifting their bare and weather-beaten heads into the very sky. There was no sound of human life—no sign of human habitation anywhere. We seemed to be all alone in the world.

"We spent three entire days in the valley. One can spend a week there without weariness; but for all purposes of mere sight-seeing, three days are sufficient. The Pohono or Bridal Veil, is perhaps the most regularly beautiful of all the falls, leaping, in one unbroken bound, 940 feet. It is seen to the greatest advantage between the hours of four and six in the afternoon, when the light falls upon it in such a manner as to produce most marvelous effects in the way of rainbows."

DISCOVERIES AND INVENTIONS ABROAD.

Manufacture of Copper and Brass Tubes.—A patent has been taken out by J. J. Laveissiere, Paris, for an improvement in manufacturing tubes from hollow ingots of copper or brass. In order to obtain a sound hollow ingot or cylinder of the metal or alloy, the patentee runs into a mold of the shape required for the exterior of the ingot the requisite quantity of the melted metal or alloy, it being either poured in at the top or run in at the side, and as soon as the metal or alloy has nearly, but not completely set, a mandrel is forced down into the metal. This is effected by means of a screw or otherwise; the mandrel is not, however, forced quite to the bottom of the mold, so that one end of the ingot will be closed; or it may be made with an internal flange only at its end. The metal is thus compressed and the volume displaced by the mandrel is caused to rise up around the core, and to fill the mold. As soon as the metal or alloy has sufficiently set to retain its shape, the mandrel is raised from the mold. In order to draw out the hollow ingots into tubes, he employs a system which allows of the metal being worked hot or cold. This system consists in employing grooved rollers, between the grooves of which the ingot is either pushed or drawn by a mandrel forced forward in any suitable manner, and in order to be enabled more quickly and regularly to draw down the tube, he employs two sets of rollers placed close together, one after the other, the axes of one set being vertical, and the other horizontal. The grooves in the second set are also made smaller than the grooves in the first set. The tube will thus nearly simultaneously be nipped by the rollers in the two directions. After the thickpess of the tube has by this means been considerably diminished, the tube is completed by being drawn through dies in the ordinary manner.

Medico-galvano-electric Apparatus.—E. T. Hughes, of London, has obtained a patent for improvements in apparatus for applying electricity in cases of disease—a practice now becoming quite common. The invention consists of various arrangements of galvanic apparatus, adapted to every part of the human body. When adapted to the head the patentee employs a wig spring, and solders to one end a silvered copper plate, of any required size and shape, having a shallow cavity formed in it for containing a conductor, consisting of several folds of flannel sewed together. On the rim outside the cavity he places a ribbon of silk, and fastens it to the conductor, over which and the silk he places a zinc plate, and clasps its edge by the rim of the silvered copper plate, the said zinc plate fitting the part of the head against which it is to be placed. The two plates are insulated by the silk between them, and the double folded rim is pressed air and water-tight; the same construction is applied to the other end of the spring, but the plates are changed—that is, the plate having the cavity is formed of zinc, and the plate which fits the head and covers the conductor and insulator, of silvered copper plate. At the top of each cavity there are two openings, one larger than the other; the larger for the passage of the fluid for moistening the conductor, and the smaller for allowing the air to escape: which openings are to be perfectly closed when the cavity is filled. The fluid employed is vinegar or dilute sulphuric acid, either of which may contain a small quantity of weak alcohol, to enable the fluid to be quickly imbibed by the conductor. When both conductors are moistened, the development of electricity is immediately perceived by the cracking noise; and when the inner plates are fitted in opposite positions against the head the galvanic current passes through it. When the apparatus is to be used for passing a galvanic current through the body from the foot to the wrist, or other parts, he uses a similar arrangement of plates, conductors, and openings to those before described; but makes them of such size and shape as the requirements demand.

Treatment of Gas with Acid.—A patent has been taken out by John Leigh, of Manchester, England, for obtaining nitro-benzole from gas. The invention consists in subjecting gas made from cannel coal used for illumination, to the action of nitric acid, by which nitro-benzole is obtained. The method of proceeding is as follows:—"Into a series of earthenware vessels, in the form and arranged in the manner of Woulfe's bottles, is introduced a quantity of fuming nitric acid, and through this is passed a current of gas, the operation being continued so long as any action is exerted by the acid upon the gas." When the operation is completed, nitro-benzole is found condensed in the bottles; which may be separated with a faucet, and employed for the manufacture of aniline colors. The gas thus treated, however, is liable to carry over some acid in the pipe. To prevent this, it is passed through an alkaline solution or moist lime, to neutralize the acid.

Refining Petroleum.—The following is the substance of a patent granted to E. V. Gardner, Professor of Chemistry, London. This improvement relates to the use of both high and low pressures, and superheated steam in connection therewith, by which means all risk of fire and explosion is obviated, and the various distinct compounds which are contained in ordinary mineral oils are separated, if necessary, in one continuous operation. The apparatus consists of a shallow and wide vessel, or still, which is kept supplied with mineral oils from a service-pipe. This vessel, or still, is provided with several conducting-tubes, each one leading to a separate condenser, and terminating in a distinct receiver, which, for convenience and safety, should be buried. The oil, previously treated with chlorides, perchlorides, or hyperchlorides of iron, zinc, tin, lime, soda, or manganese, or any such compounds, or a mixture of two or more of them, is run from the agitator, in which it has been thoroughly treated with the above named substances, into the still, or the oil and chlorides are introduced without agitation. Steam of low temperature is allowed to enter by a pipe, and traverses a perforated coil in the bottom of the vessel, escaping with the light oils, and passing off to its condenser. High-pressure steam is now introduced into the same coil by means of convenient pipes from the same or another boiler, and the product of this second process passes off to its distinct condenser and receiver-pipes, the others being closed. Superheated steam is next passed from a third source, through the same coil, the former pipes being closed, and passes by a third condenser-pipe to its receiver. These condenser pipes are fitted with taps for use as required. The remaining dead oil is run from the vessel through a tube or pipes to a general receiver while hot, and submitted to further distillation.

If the oils be not previously agitated and treated with chloride or chlorides, but introduced with them into the vessel, then, after being submitted to steam at 212° Fah., and at high pressure before the introduction of the super-heated steam, the mixture must be allowed to subside, and the solution of chloride run off. The remaining oil is then treated as if chloride had not been present. In these processes neither acids nor alkalis must be allowed to come in contact with the oils previous to the above treatment, as by the action of the acid the oil is considerably carbonized and the production in pure oil lessened.

Breech-loading Ordnance.—A. F. Blakely, London, the inventor of the Blakely gun, has taken out a patent for an arrangement of breech piece, which is opened by the recoil of the gun, when the shot leaves the muzzle, so as to permit the gun to receive a fresh charge without further trouble. The breech piece enters the barrel to an extent sufficient to insure its not leaving the breech end until the shot passes out of the muzzle.

NEW BOOKS AND PUBLICATIONS.

SYSTEMS OF MILITARY BRIDGES; by Brigadier-General George W. Cullum, Lieut-Colonel Corps Engineers, U. S. A. Published by D. Van Nostrand, at 192 Broadway, New York.

This is a handsome scientific and practical work, illustrated by a large number of wood cuts and lithographic plates. The author is an accomplished military engineer, and is Chief of Staff of the General-in-Chief of the armies of the United States. The different systems of military bridges adopted for the armies of the European Powers, as well as those in use in America, are very clearly described. The passage of rivers is considered the most difficult and hazardous of all military operations; and no army should take the field without means to overcome all obstacles. The importance of military bridges, during our present war, affords good reason for the production of this work at the present time. The experience of our army on the Chickahominy and Rappahannock has shown how the fortune of war may be borne upon a few frail pontoons. Military bridges should be light and strong, easily put up, taken down, and transported. The American india-rubber pontoon bridge is fully described, and appears to surpass all other portable bridges. The first india-rubber pontoon bridge experimented with was in 1836, by Captain John F. Lane, U. S. Army; it is 350 feet in length, and was thrown over the Tallapoosa river, in Alabama. Such bridges were afterwards practically used in the Mexican war, under the charge of General Cullum. The pontoons consist of vulcanized india-rubber cylinders, divided into compartments, and when used for a bridge, they are inflated and anchored at intervals of about 18 feet apart, parallel with the current of the river. They thus form floating piers, upon which the plank roadway and superstructure are laid. When the bridge has to be lifted, the superstructure is taken apart, the pontoons are taken out, and the air expelled from them; when they may be packed closely in suitable wagons and easily transported to their next destined position. The French have borrowed the construction of such military bridges from American engineers. General Cullum describes a remarkable instance of American engineering originality and energy in the erection of a temporary railroad bridge across the Potomac Creek, by Brigadier-General Herman Haupt, C. E. It was put up to replace one burned by the rebels; was 400 feet long, 80 feet in hight, and the labor was done by the soldiers. It was constructed of trees cut from the forest in the vicinity, in May 1862; and only nine working days were occupied in its erection.

General McDowell, in his defense before the Court of Inquiry, said respecting it:—"It is a structure which ignores all the rules of military science, as laid down in books. It is constructed chiefly of round

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sticks cut from the woods, and not even divested of bark; the legs of the trestles are braced with round poles. It is in four stories—three of trestles and one of crib work. It carries daily from 10 to 20 heavy railway trains in both directions, and has withstood several severe freshets and storms without injury." This bridge has excited to a high degree the admiration of several European military officers who have visited the scene of military operations in Virginia.

QUESTIONS ON SUBJECTS CONNECTED WITH THE MARINE STEAM ENGINE; by Thomas J. Main, M. A., Professor of Mathematics in the Royal Naval College, Portsmouth; and Thomas Brown, Chief Engineer, R. A., attached to the Royal Naval College. Published by Henry Carey Baird, 406 Walnut street, Philadelphia. Price $1 50.

This is a republication of a London work, the chief object of which is to afford practical solutions to questions relating to the construction and working of steam engines: especially the marine engine. It constitutes a valuable help to engineers who design to enter the American navy, although intended for those of the British navy. It contains the questions from the examination papers, for engineers before the naval board, with hints for their solution. The following is an example of the questions and answers contained in it:—

"The stroke of an engine is 7 feet 6 inches, and the diameter of the paddle-wheel is usually about eight times the length of the crank; find the diameter of the paddle-wheel.

(1). 7 feet 6 inches ÷ 2 = 3·9 inches the length of crank.

(2). 3 feet 9 inches × 8 = 30 feet the diameter of paddle-wheel."

PAPER-MAKING IN AMERICA.

In the very interesting communication on the history of paper-making, which was published in our last issue, we stated that the first paper-mill in America was erected on Chester Creek, Pa, by a Mr. Wilcox. This information was derived from the invaluable treatise of Mr. Joel Munsell, of Albany, N. Y., on "The Chronology of Paper and Paper-making." Since then we have learned that Mr. Horatio Jones, of Philadelphia, read a paper on this topic on the 5th instant before the New England Historic-Geological Society, Boston, in which he claimed an older paternity for the manufacture of American paper than is claimed for Mr. Wilcox. He said "the idea had been generally propagated that the first paper-mill in America was established by Thomas Wilcox, on Chester Creek, Delaware county, Pa., in the year 1714. Standard historical writers have so stated it. That mill was, however, the fourth or fifth in America, and was not built till 1729 or 1730. From 1690 until 1710, there was but one paper-mill in all British America—the Rittenhouse paper-mill. It was situated in Germantown, Pa. The first manufacturer of paper in this mill was William Rytting-huisen, now anglicised into Rittenhouse. He was born in the principality of Broich, in 1644, came to Pennsylvania soon after his arrival in America, and was among the early settlers of Germantown. In 1700 or 1701 the pioneer paper-mill of America was carried away by a freshet. So important did William Penn regard the mill, that he wrote a letter or certificate recommending the citizens of Pennsylvania to aid in rebuilding it. This was done about the year 1702. It has been in possession of, and worked by the descendants of Rittenhouse, as late as 1855. It is now the property of Peter Rittenhouse, who has lately converted it into a cotton factory."

Mr. Jones said that the water-mark so much used by the early paper-makers had enabled him to discover, in an old blank book, some of the paper made in this mill before 1690, on part of which his sketch was written.

A NEW RAILWAY DANGER.—Swarms of locusts have, in many cases, lodged on the Ottoman railway, and compelled the engine-drivers to proceed with great caution. The locusts on being crushed by the engine on the rails, make them excessively greasy and slippery, so that the wheels will scarcely bite. The consequence is some degree of danger, and sand has to be dropped on the rails to give the wheels a hold.

Correspondence

Music by Telegraph.

MESSRS. EDITORS:—The idea of introducing music into families within the limits of a city, by means of electricity, has at times been the *beau ideal* of my inventive speculations for the last several years. That every parlor of a city could be furnished with music, and music too of the highest order, as the most of houses are furnished with gas and water, should not be considered one of the impossibilities of the age. From the attention I have given to the subject, I believe the plan is highly practicable, its merits being—simplicity in mechanical construction, perfection in operation, and affording a novel, but most exquisite pleasure to many private families and social circles, at a trifling expense.

To explain what would constitute the mechanical construction of this happy invention. In some central part of the city locate the musical depot or studio, say of a highly skillful performer on the piano, melodeon, or organ; we will select the piano. To this instrument there is an electrical attachment, which may be made to communicate with a thousand other pianos in the city, these again having their own peculiar magnetical attachments. In this arrangement there would be a half an inch thick electrical conductor or poles, running through different parts of the city, as the means of communication from the operator's piano to those connected therewith throughout the city. Here is a state of affairs where one person may be playing a thousand pianos at the same time! There would be no speculation as to the perfect success of the operation. From what we know of electrical velocity, and its precision of action, there is a certainty, that as the music is performed at the depot-chamber, so will it be reproduced precisely at the player less piano in each dwelling with which it may be connected.

In regard to the financial character of this invention, it would not require much of an effort to be made popular; and to make it popular would be to make it profitable. We are of the opinion, it would be a stock operation that would pay, probably better than any other. Those taking an interest in this invention who wish further information on the subject, may address the subscriber.

G. P. HACHENBERG, M.D.

Springfield, Ohio, Aug. 9, 1863.

[The above is certainly a novel use for the electric current. But there is probably no practical difficulty in the way of its successful accomplishment. Things more wonderful are done every day through the agency of electricity. We would, however, advise all our young lady friends to continue the study of music with as much zeal as ever; for there is no more likelihood that this telegraphic music will take the place of ordinary performances, than that telegraph writing or messages will supersede ordinary correspondence.—EDS.

Molasses from Indian Corn.

MESSRS. EDITORS:—The present high price of sugar should be the means of directing attention to the production of sugar or molasses from Indian corn, which is so abundant and cheep. In repeated trials, I have obtained 5½ gallons of molasses from one bushel of corn, weighing 56 pounds; and I have purchased the corn at 25 cents per bushel. From 50 pounds of corn meal I have made 6 gallons of molasses of 28° Beaume, which is equal to about 31½ pounds of sugar. such molasses are not so sweet as those of the sugar cane; but their taste is pleasant and not quite so bitter as those made of the sorghum.

F. A. HOFFMAN.

Beardstown, Ill., Aug. 12, 1863.

BLACKBERRIES are the only luxury of the soldier, at present. Virginia is one vast blackberry field, and it is said, in consequence of living on this diet, the army never was in a better sanitary condition. The surgeons say that since the army returned to Virginia, the free use of blackberries had saved the Government nearly a million of dollars in medical and hospital stores.

Trial of the "Manhattan" Steam Engine in London.

The *Mechanics' Magazine* has the following paragraph on this subject:—"This engine, which has received a partial repair at the hands of Messrs. Shand and Mason, underwent some experiments on Saturday, in the presence of a numerous body of engineers and others concerned in such matters. The trials were conducted at the Shadwell entrance to the East London Docks; the site was extremely convenient for testing alike the drawing and forcing powers of the machine, the vertical distance from the rotary pump to the surface of the water in the basin being nearly 15 ft. Steam was got up a little after 1 o'clock; the times and pressures were nearly as follows:—In 11 m. from the application of the match, the engine got to work with steam at 20 lb., drawing water immediately, without priming the pump; in 14½ m. the pressure was 40 lb.; in 15 m. 45 lb., when the engine was stopped for a short time; in 15½ m. the pressure was 55 lb.; in 16 m. 60 lb.; at 62 lb. the engine started, throwing a very steady jet through a 1¼ in. nozzle to a distance of about 150 ft., with a pressure in the air-vessel of about 80 lb.; in 18 m. 40 s. a pressure of 100 lb. was reached, with 140 lb. in the air-vessel. The engine making about 280 revolutions per minute, some very fair work was done; but at this juncture a leak was sprung in the boiler, which, though very trifling, so far damped the fire as to render it impossible to keep steam. After a little time the leak stopped itself, and the fire was re-lit, but without producing any very good results. Whether from a defect in the quality of the coal, or that the boiler has been more injured than appears at first sight, it was found impossible to keep up the water supply and the pressure in the boiler at the same time; the introduction of the feed pulling down the pressure with a rapidity which was very remarkable. The engine and pump of the machine leave little to be desired; but the boiler, if it cannot accomplish better results than any we have seen, must, we fear, be pronounced a failure. After a couple of hours, the coal provided having been consumed, all further trials ceased, the engine returning to London.

A Rainy Month.

July, 1863, will be remembered as the rainy month, especially by farmers, who paid $56 a month to haymakers. J. P. Hall, of Hancock street, Boston, informs us that, during the month of July 12 36 inches of water fell in this city: the average fall for July, for 38 years here, having been 3·42 inches. Excess 8·96 inches. During the present year, at the end of seven months, 42·31 inches of water had fallen. The average for the first seven months, for 38 years, is 24 37 inches. Excess in the present year, 17·94 inches. In August, 1826, 12·10 fell; that was a remarkably unfavorable month for haymaking in western Massachusetts. That year the 'September scythes' rung to an almost unprecedented rate. In November, 1840, 11 63 inches of water fell; and in August, 11·11 inches fell. Thus, July stands ahead of any corresponding month in the record that we have access to at the time of writing. Down to the 8th day, only ·03 of an inch had fallen. In Lowell, from the 6th to the 29th, 10·023 inches fell, or about one-fourth the usual annual amount. In Lawrence, the amount was 8·75 inches. Farmers have been great sufferers, and it is feared the herds and flocks will be, on the coming foddering season. As the quality of the grass must have been greatly impaired, both by the rains and the ripening thereof, before it can be cut and made, as the season is quite advanced; the time having come when haying, for the last ten or fifteen years, has been finished, though formerly it was much later. At Harvard College Observatory, Cambridge, the fall of rain in July was 12·43 inches, or very nearly the same quantity as in Boston. The extremes of the thermometer in July were 87° on the 3d, and 55° on the 24th—range 32°.—Boston *Cultivator*.

SMALL as Connecticut is, she can boast of having nearly 3,000 industrial establishments, and a capital to the amount of $46,000,000 invested in manufacturing business, giving employment to 60,000 hands. If we add together all the industrial products of North Carolina, South Carolina, Georgia, Florida, Alabama, Texas, and Mississippi, then Connecticut is $20,000,000 in advance of them all.

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Building and Heating Houses.

As houses have always been built, there is great loss in heating them, except by the use of a stove with a long pipe, or a hot-air furnace; the latter placed in a room which you wish heated, instead of in a cellar or basement, where the heat from the furnace is lost. In grates and fire-places, I presume fully three-fourths, if not more, of the heat goes up the chimney and is lost. These are the most healthy and pleasant, and we, therefore, generally put up with the loss of the heat for the sake of their superior comfort and convenience.

But is there no way to build a house whereby we can combine the economy of the stove and pipe with the advantages of the open fire-place? If it could be made to draw well I would propose hollow outside walls, made of three instead of two walls. The first cost of a house would be somewhat increased by building in this manner; but the more uniform temperature of the atmosphere within, to say nothing of economizing fuel, would much more than compensate for this increased cost, with all by whom comfort and good health were the chief objects desired. The outside wall would absorb all the moisture and frost, requiring none of the inside heat to neutralize it; and the air between it and the middle wall would be a good non-conductor. Then let the heat from the fire-places pass between the inside and the middle wall, making the whole circuit of the house, from bottom to top, and finally escaping with the smoke from short chimneys or ventilators in the roof. Thus all the heat would be economized, and a temperature be imparted to the inside wall, and from that to the room, sufficient, with the fire in the open grates, to warm a building in the most agreeable manner. The heat from the kitchen range also may be thus used. The Russian stove is made upon this principle, and I never experienced more agreeable heat than its finely polished walls give out into the rooms.

With such walls, a house would be cooler in the summer and warmer in the winter; making the temperature much more equable throughout the year. A flue may be introduced to carry off the heat from the kitchen range in the summer.

I have but one fear about this system, namely, whether a good draft can be got between such open walls? Each fire-place should have its own division of space to heat; for, if there is more than one opening, of course there could be no good draft.

Another great advantage in hollow walls is, that you can plaster on to the inside wall, and thus make your house rat, mouse and even bug proof. All these creatures to me are an intolerable nuisance, and should never be permitted in any decent house.

A.

Observations on Rain in a Balloon.

Mr. Glaisher, the English aeronaut, has published an account of his thirteenth ascent, in a balloon, for scientific purposes. It took place on the 26th day of July last, from the Crystal Palace at Sydenham. His objects were to determine whether there was a stratum of cloud at a certain elevation above that from which the rain drops fell; also to determine the size of the rain drops at different elevations. Mr. Glaisher's conclusion is, that whenever rain is falling from an overcast sky there is a second stratum above, but with an overcast sky and no rain, then the sun is shining on the upper surface of the clouds. In regard to the second point, he says:—"The size of the rain drops as they fell on my note-book before starting, was fully as large as a four-penny piece; they decreased in size on ascending; but our upward movement was too quick, and we soon passed out of rain. On descending from above the clouds, we first encountered a dry and then a wet fog; passed into that which may be described as damp air or exceedingly fine rain; then experienced very fine but decided drops of rain, like pins' points, covering the note-book; these increased in size on approaching the earth, but more rapidly when very near the earth. The drops of rain, on returning to the earth, were as large as those noted on leaving, and rain had been falling heavily all the time we were in the balloon."

ERRATUM—WIRE PLATES.—In the useful table published on page 108, current volume of the SCIENTIFIC AMERICAN, the heading "Plates—per Lineal Foot," should be "Plates—per *Square* Foot."

WORKING STEAM EXPANSIVELY.

The Government has appointed a new series of experiments to be made, upon the subject of working steam expansively. These experiments will take place under the direction of two commissioners—Horatio Allen, Esq., President of the Novelty Iron-Works, in this city, and B. F. Isherwood, Chief of the Bureau of Steam Engineering, at Washington, D. C. These trials are to be conducted in the most careful manner, and with entirely new mechanical apparatus, constructed expressly for the purpose, with a view to great precision in the results. The arrangement of the machinery is known to us, and we shall enlighten our readers upon the details at an early day, laying the results of the experiments before them as soon as they are completed. We think these trials, for there will be several, will be conclusive, and settle this vexatious question at once and forever.

MISCELLANEOUS SUMMARY.

ENGINEERS ON CAPTURED VESSELS.—Engineers in the Navy who are transferred to prizes are usually supposed to have a fine time; the following extracts from a letter to a daily paper will serve to disabuse the minds of those who entertain such ideas:—"The lamps are trimmed and watches set, and all hands prepared for a lively time; but a storm springs up and causes our vessel to leak. The pumps wont work, being choked with fine coal. Fisher goes down into the bilge, and stands, up to his waist in water, till he gets the bilge pump in operation; but that only lasts a short time, for it soon gets choked again, and recourse is had to the bilge injection, which keeps the ship clear. All night we worry along, with the expectation that morning will bring relief; Fisher and myself having been passing coal and firing up with but few hours rest since we came aboard. Jones has just carried away the check-valve on the after boiler, and we have had to haul the fires, &c." It was very culpable in "Jones" to carry away the check-valve. He should have been put in irons, or made to bring it back instantly.

OIL REMEDY FOR FLIES.—The New Haven *Courier* says: "The annoyance of these summer pests to animals can be greatly mitigated, by the use of a mixture of one-third kerosene oil, and two-thirds lard oil, applied to the legs of horses, oxen or cows, with a feather or brush; or, what is better, but more objectionable to the applier, with the hand, rubbing it well in. A farmer in the neighborhood used it last summer on his oxen, having it applied twice a day on their going out to work—morning and noon. His cattle gained in flesh during fly-time. I have used it on horses and two cows. Its benefit is immediately observable. A horse, uneasy, fretting and stamping, becomes at once quiet, after the application. Those who sympathize with the noble animals in the constant teasing endured by them from these pests, will be glad to use any harmless remedy, which will spare incessant work, when not called to labor in harness. Horses will keep better on a less supply of food, for the repose thus obtained."

A BIG BLAST.—The Lake Superior *News* notices a remarkable blast, which took place near Marquette recently. In ordinary blasts, a hole of an inch and a half in diameter is drilled; but in this case one of four inches and eighteen feet deep, was made, distant from the edge of the cliff about ten feet, into which one keg of powder was put, and exploded as preliminary, which had the effect to open a seam to a depth of fifty feet. Sixteen kegs of powder were then put in as a final charge, which threw down over 3,000 tuns of ore, so completely broken up, that the largest portion was small enough to load on the cars for shipment, without further reduction.

USEFUL HINTS.—Never enter a sick room in a state of perspiration, as the moment you become cool your pores absorb. Do not approach contagious diseases with an empty stomach; nor sit between the sick and the fire, because the heat attracts the thin vapor.

COAL MINING.—Statistics of the Pennsylvania coal trade for the present season show an aggregate production of nearly 5,000,000 tuns, against less than three and three-quarter millions to the same time last year.

THE "IRONSIDES" AT FORT SUMTER.—The manner in which the armor of the *Ironsides* has thrown off the rebel shot causes general satisfaction, though she has not yet been closer than 1,800 yards to the rebel batteries. Most of the heavy shot have crumbled to pieces on her solid sides, and the rifled shot have only made indentations without doing the slightest damage. She has received two 10-inch shot on her port stoppers, and even there they only made indentations without doing any harm to them. The steel-pointed shot have made cuts about an inch deep. She will, however, be tested within 800 yards when the great assault is made.

GRAPES AND MUSHROOMS.—It is a curious coincidence that when the vine disease appeared the common eatable mushrooms entirely disappeared. In the districts of Maçon, Lyons, and the banks of the Rhone, which were great sufferers from the oïdium, this vegetable has again appeared. Whether there is really any relation between the reappearance of the one and the disappearance of the other, remains to be seen; but it is not unnatural that the vine-growers should believe and be fully convinced that there is.

ABUNDANCE OF PRAIRIE CHICKENS.—The Dubuque *Times* says that "never since Iowa has been settled by the white man, have prairie chickens been as numerous as at the present season. In Buchanan and Blackhawk counties, they can be killed with stones and clubs; and hunting them with guns is next to no sport at all. So plenty are they that the farmers importune hunters to try their luck on their grounds; and in some instances they have manifested a willingness to pay for the killing."

NEARLY every gate in the city of Vicksburg is now adorned with an unexploded 13-inch shell, placed on the top of each post. The porches and piazzas also (nearly every house has one) are ornamented with curious collections of shot and shell, which fell on their premises during the bombardment of the city by the Federal forces.

THE greatest capture of men related in modern history, is that of Napoleon at Austerlitz, where he took 20,000 prisoners. Gen. Grant at Vicksburg, took 31,000. The spoil at Austerlitz was 150 pieces of artillery; that at Vicksburg is set down at 238.

A VIADUCT for foot passengers is to be built over Ludgate Hill, London, a crowded thoroughfare. Why not build a similar arrangement over South and Water streets, in this city, to enable people to get to the ferries?

THE difference between rising at 5 and 7 o'clock in the morning, for the space of 40 years, supposing a man to go to bed at the same time at night, is nearly equivalent to the addition of ten years to a man's life.

ADVICES from Labrador state that the fisheries on that coast, both for cod and salmon, have been unusually successful. There are, however, but few American vessels on the ground.

A PIANO, four feet long, nineteen inches deep, and three feet four inches high, with a compass of seven octaves and a full rich tone, has been introduced into London, and is sold at less than a hundred dollars.

IMMENSE guns for the New York harbor fortifications are constantly arriving from Pittsburgh. The forts will not lack armament, whatever may be other delays or deficiencies.

LONDON streets are in a very crowded condition. St. Swithin's Lane was blocked up for eight hours and ten minutes, out of ten hours, on three specified days.

THE Woolwich Select Committee have discarded cast-iron altogether, as a material for rifled guns. They recommend coating shot for rifled guns with lead.

THE *Wool Grower and Manufacturer*, San Francisco, Cal., states that hundreds of tuns of coal are now furnished by the Mount Diablo coal mines.

THE French cavalry use scabbards which contract to half their length when the sword is withdrawn. How are they made?

Two British forgers of Yankee greenbacks have been sentenced, one to 15 months hard labor, and the other to 4 years penal servitude.

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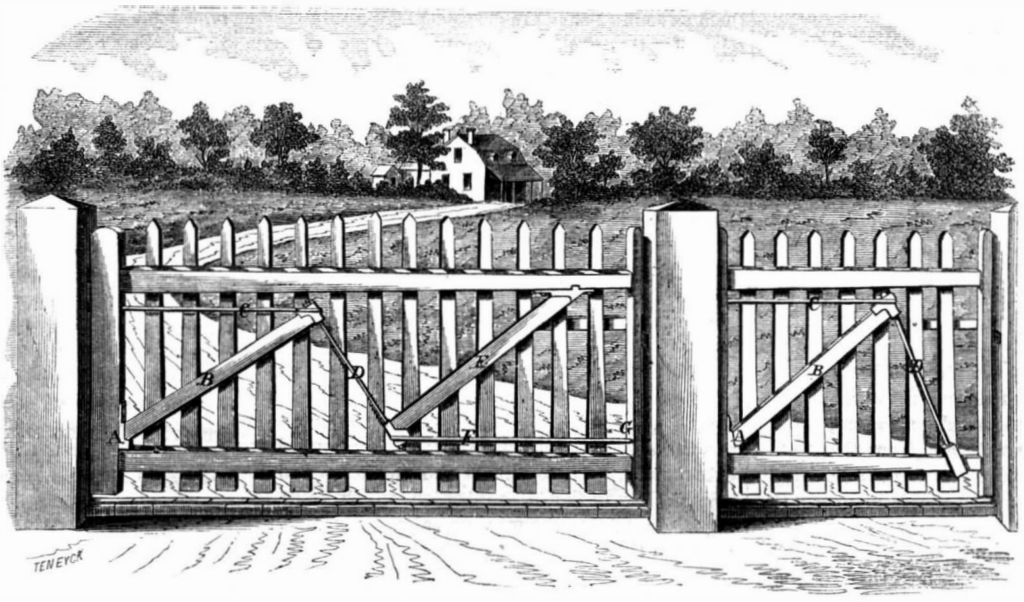
Improved Farm Gate.

There is nothing more annoying to individuals passing in and out of gates in the country, than the sagging or dropping of the end, so that it drags upon the ground, and cannot be opened at all unless the whole structure is lifted bodily up. This defect has been remarked by every observing person ; and the evils arising from it are not confined to the mere inconvenience of it. When a gate sags in this manner, it is hardly ever shut, and allows a free entrance to all animals astray upon the highway. Many a promising crop of corn, and garden patches generally, have been ruined by leaving the gate open ; for which neglect there was always the excuse that "it wouldn't shut ;" in too many cases literally true. An enterprising inventor at the West, deeming that the shiftless method of hanging a gate on hinges, and leaving it to sustain itself, had gone quite far enough, has devised the self-sustaining gate herewith illustrated. It will be seen that the body of the gate is very strong, as also are the posts to which the hinges are connected. To the bottom of these latter there is fastened a cast-iron shoe, A, in which the foot of the diagonal brace, B, sits ; the top of this brace has also a cast-iron head upon it, over which the tie rod, C, passes, the opposite end being secured to the main post by a nut and washer. From the head of the diagonal brace a second tie rod, D, proceeds to a second brace, E, the upper end of which fits in a casting let into the upper rail, while a third tie rod, F, connects with the outer rail, G. The plan of this gate, and its advantages, are so apparent to the observer as to leave little margin for an explanation. From the construction of the braces and the arrangement of them and the tie rods, it will be seen that the weight of the gate is wholly supported by the hinges, and through them by the large stone or wooden post, H; the first series of braces and the rods constituting a literal derrick (such as is used for hoisting heavy weights), and thereby affording a reliable support to the whole structure. Provision is made in the nuts on the ends of the rods for bracing the gate anew, whenever it may have been racked or strained by the weather or bad usage. There is no reason why this gate, if well made, should not do all that is claimed for it, completely obviating the objections existing against ordinary gates, and furnishing a safe, sure, and easily operated means of closing entrances about farms or residences. Small gates are readily made upon the same plan, but do not require more than one diagonal brace ; an elevation of a small gate may be seen on the right of the engraving.

Patented through the Scientific American Patent Agency, on June 30th, 1863, by William C. Herider, of Miamitown, Ohio. For further information address the inventor at that place.



HERIDER'S PATENT FARM GATE.

MILES'S WAGON STAKE.

The light castings and fastenings represented in the accompanying engravings, are those recently invented by O. E. Miles, for a new and improved wagon stake. The inventor informs us that many persons are using them, who assure him that these stakes save in iron work on every set used, and give better satisfaction than others of the ordinary kind.

The usual mode of constructing the main uprights, and securing them to the bolsters of wagons, is probably so familiar to most of our readers as not to attract their particular attention. Wooden stakes, or standards, are mortised through the bolsters at their ends (thus greatly weakening them), and are secured thereto by several wrought-iron braces which are attached by bolts and rivets. Besides these, a band is usually required around the end of the bolster, to prevent it from splitting. All this, from its complicated nature, is expensive and troublesome ; and if the parts are broken, a very expensive job of repairing is involved.

This improved stake, as will be seen by the engraving, Fig. 1, has a body, A, with a foot, *a a' e*, having a shouldered recess in its under side, which, when the bolster, B, is dressed to a proper form, and the end rounded to a compass mark, is easily and quickly fitted thereto so as to be secure against slipping, either endwise or laterally. The flange, *e*, on the under edge keeps the stake in position, laterally, and prevents water from getting under the casting ; while the part, *a'*, of the foot is let into the bolster, as indicated by the dotted line, so as to hold the casting very firmly against slipping endwise. The casting is held down by a clip and bolt, the clip, *c*, passing around the under side of the bolster, B, and up through the foot, *a*, on each side, secured by nuts. A countersunk bolt also passes down through *a'*, having a nut, *d*, on the under side of the bolster.

This structure is so shaped and applied as to secure the necessary strength and stiffness with these simple fastenings ; and it is claimed that it weighs even less than the ordinary wooden stake with its wrought-iron work attached.

Fig. 1

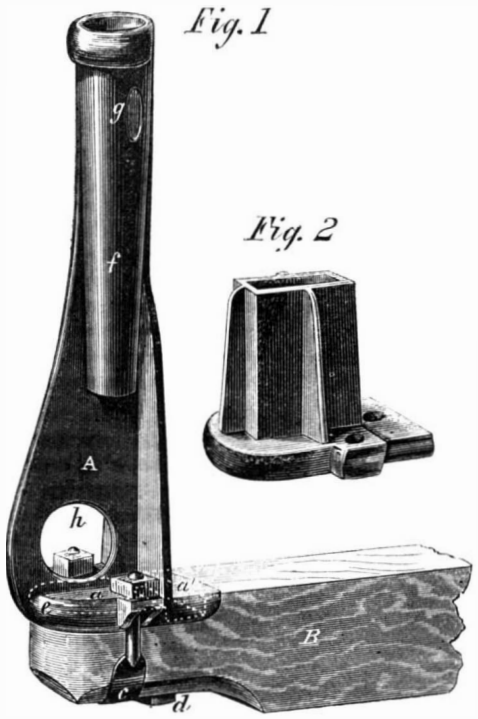


Fig. 2

The opening seen at *h* furnishes convenient means for securing a binding rope when one is used. In case of this stake getting loose by the shrinkage of the bolster, it may be tightened with the greatest facility by an ordinary wrench. In the event of one getting broken, a new one, previously provided at sligt expense, may be substituted by the same simple means. Such an adjustment or substitution is beyond the skill of the most intelligent wagoners, with the ordinary mode of construction.

Another feature of this stake, which makes it superior to the ordinary kind, is the socket, *f*, with which it terminates at its upper end, furnishing an ever-ready means of lengthening it to any hight desired, by the insertion of a suitable extension piece, which may be a simple wooden bar. This is found necessary when very bulky loads are carried, such as rails, sugar-cane, &c. The opening, *g*, admits a key to confine the top stake if desired.

Many wagons are now constructed with an extra box, to be used on the top of the other when the loading requires it. This upper box is ordinarily secured to the lower one by cleats screwed to the upper one, and passing through staples inserted in the lower box. These cleats and staples are very liable to get out of repair. With this invention a set of extra stakes may be screwed to the upper box with their lower ends fitting into these sockets, *f*. And a further use for these sockets, the inventor, writes, will be found when we come to celebrate the re-establishment of the authority of our Government, "what convenient places they will be to set our flag staffs, carrying, if we choose, four at once."

Fig. 2 represents a modified form of this stake, intended for trucks and sleds for drawing logs, &c. The foot and fastenings are the same as Fig. 1, with a simple rectangular socket, four inches in hight, which admits of a log being easily rolled over it. This casting receives a wooden stake, of suitable form and of any desired hight.

Further information may be had concerning this device, by addressing the inventor, O. E. Miles, at Aurora, Ill., who has taken steps to secure a patent.

A Tremendous Shock.

Dr. Jerome Kidder, of New York, has lately enjoyed the happiness of receiving, with perfect safety, a shock of electricity sufficient, according to the previous ideas of scientific people, to kill fifty men. The experiment took place at the Cooper Institute, under the direction of the eminent Professor Van der Wede, of that institution. The battery consisted of six of the large Bunsen cups and a Ruhmkorff coil, of sixteen miles of wire, made by E. S. Ritchie, of Boston—one of the best makers in the country. A most formidable battery truly ! The New York *Tribune* states that Dr. Kidder had observed that the longer the wire was used the greater the tension, and consequently the greater the ease with which the current is conducted through the body. Hence he argued that the enormous length of the wire in the Ruhmkorff coil must render the current so highly conductible that, in spite of its great power, it would not lacerate the tissues of the body. He staked his life on his opinion and won it.

Force of Habit.

As an instance of the force of habit, a lady remarked to us the other day that so accustomed was she to wearing her thimble when sewing, that she now never sits down to her sewing-machine without putting it on, although it is of no service to her in the management of the machine. Her finger does not feel right without it. Yet, notwithstanding the power of habit, this little implement seems in danger of going out of use, along with the bellows, the fire-dogs, tinder boxes, and many other familiar articles of domestic use now superseded by similar inventions. All sorts of sewing are done by machinery ; and the time will come when the needle and thimble will be as little seen in the hands of women as the staff and the spindle now are.

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The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Three Dollars per annum—One Dollar in advance, for our months.
Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
☞ See Prospectus on last page. No traveling agents employed.

VOL. IX, NO. 9...[NEW SERIES.].....*Nineteenth Year.*

NEW YORK, SATURDAY, AUGUST 29, 1863.

THE NATIONAL BANK.

Capitalists who, seeing this heading, look to the column below for a financial dissertation on the prospect of a national bank, will be disappointed. We have no such object in view at this writing.

The almost illimitable expanse of country west of the Alleghenies contains in its boundaries the food and the future prospects of thousands on thousands of human beings. It may not inaptly be called a never-failing bank, with no repudiated or protested notes, and no shaky credit. Of the vast capacities of the Western country for growing grain it is unnecessary here to speak; but it may not be amiss to place on record a few figures concerning the amount of food in the shape of breadstuffs, exported from the region in question, as compiled, by the *Commercial Bulletin*, from the report of the Chicago Board of Trade :—

"The Upper Mississippi basin, including the nine States lying northwest of the Ohio river, embracing an area of 525,301 square miles, and first colonized in 1788, now contains a population of over 9,000,000, which, on an average, has doubled itself every ten years since the beginning of the present century. This territory, from the adaptability of its physical features to agricultural pursuits, and the uniformity of its climate, soil and productions, may well be called the great food-producing region of the New World. Its industry, thus far, has been almost exclusively devoted to this purpose, and the value of its annual product is upwards of $350,000,000, notwithstanding that only about 15½ per cent of its area has as yet been brought under cultivation. After supplying the deficiencies of the seaboard States, the Northwest has a surplus of breadstuffs and provisions left for export to foreign countries, which, in four years, has increased in value from $38,300,000 to $133,750,000 ; being more than 70 per cent of the entire exports of the country last year, exclusive of gold.

"Of this immense product, the cereals alone brought into market from 8 of these food-producing States, according to the last census, amounted to 550,000,000 bushels in 1859, when the crops were nearly one-third deficient as compared with those of the two succeeding years. To convey an adequate idea of the motive power required to distribute this prodigious mass in a crude state, it may be stated that it would employ more than 64,400 locomotives, each hauling 8,500 bushels, and, if required to deposit their freight at a given depot, trains must arrive oftener than once in seven minutes, by day and by night, throughout every working day in the year.

"The commerce of the Great Lakes—which are now and must continue, for all future time, whatever may by the political condition of the country, the principal outlet for the productions of this inland region—reaches an annual value of $450,000,000 ; more than twice the external commerce of the whole country—and is carried on by a fleet of 1,643 vessels, of an aggregate tunnage of 413,026. It is estimated that before the lapse of another decade, the increase of this branch of commerce will require double this amount of tunnage, and of course a corresponding increase of transportation facilities between the Lakes and the Atlantic seaboard.

"The re-opening of navigation on the Mississippi can be of no great advantage to the Northwest, unless at the same time the great Southern market for the consumption of its products is also restored. As a channel for exportation, by which the European markets may be reached, it is of but little account to that region, as the very insignificant shipments of Western produce from New Orleans, previous to the war, as compared with those from Atlantic ports, clearly demonstrate. The exports of provisions and breadstuffs from the former, in 1860, were only $1,200,000 in value, against $21,200,000 from New York.

"In the early settlement of the West, it is true, the Mississippi was the only outlet for the products of that section, notwithstanding the disadvantage which it involved of a detour of 3,000 miles from the direct Eastern route to Europe, of a malarious climate, and the heated waters of a tropical sea destructive to most articles of food of Northern production. But the opening of the New York and Canadian canals, in addition to five trunk railways between the East and West, has naturally diverted the current of Western trade from the South to the East, and rendered the free navigation of the Mississippi a matter of secondary importance.

"Aside from military and political considerations, what the commercial exigencies of the present day demand, is increased facilities of communication with the West, by the shortest, cheapest and most practical route."

The development of the agricultural resources of the Western empire, for such it is in extent, has been due to wholly natural causes ; but they have been aided materially by the artificial outlets provided by various states, and incorporated bodies likely to reap benefit from their outlay. Of these means of transporting the grain to market, and of feeding the hungry in every part of the world, the Erie canal and railroad, the Illinois Central, and, in fact, many other important lines of railway and canals afford examples in point. Another cause of the growing importance of the Great West is the steady stream of immigrants, who, taught frugality and industry by vain efforts to wrest subsistence from the ungenerous soils of the Eastern States, seek the promised land, and find their anticipations fully realized. We believe the Western country affords innumerable opportunities for enterprising and determined young mechanics to settle at various points, and contribute of their skill to make the wilderness hum with the sound of civilized life, to decorate the fertile plains with comfortable homes, to erect mills and factories of all kinds, for which the peculiar locality affords facilities ; or in a more humble way assist the immigrant, as he will aid them, to establish a high grade of social and mechanical cultivation. For all of these enterprises there is scope and verge enough ; and the new State of Nevada, which we learn is about to petition for admission to the Union, will afford another outlet for the surplus population of our large cities. It is necessary for the moral health of overcrowded towns that they should change their population often ; so that the disaffected may reap benefit by a change of scene, and the city derive advantage from their absence. In every large vessel containing liquid, there will be dregs, and continual excitement and shaking brings the turbid element to the surface. So when political agitations upheave all classes of society, riot and mob-law strive very hard to get the upper hand. Let all such be sent to the wilds of the Western country; not among honest settlers, for these would repudiate them, but from the grizzly bear and the wolf let them learn mercy; and from the savages who yet roam the prairie, how to respect those who are helpless. Let the Judges sentence the rioters to a sojourn in the wilderness, and they will do the States more service than anywhere else.

THUNDER STORMS—LIGHTNING CONDUCTORS.

During the late "heated term" thunder storms were more frequent and the lightning more vivid than usual. Cases of buildings struck by the electric fluid have been numerous; but less damage to life and property has resulted than could have been expected. We have collected a few facts respecting some buildings which were struck, which we think will be interesting and instructive.

In the Eastern District of Brooklyn the house of Mr. Harris, in Devoe street, was lately struck by electricity, in a storm which took place at midnight. The third building from this is a high brick structure used as a manufactory, and the one next to it is a frame house, like itself, but much higher. A common opinion prevails that lightning always strikes the highest objects in the vicinity of which a storm occurs. This notion was not verified in the present case, as the lowest building in the line of three was the one struck ; and the electric fluid, instead of entering by the chimney—the highest point—entered by the corner beam of the upper room. It passed along the ceiling, throwing down the plaster over and around the bed, where two children were asleep, then passed out by the frame of the window, leaving a charred hole, and breaking one pane of glass. The beam by which the lightning entered was reduced to powder ; and during a small portion of the course taken by the fluid, it moved on the gas pipe, and bent down the arm of the burner, just before passing out by the side of the window. We would have conjectured that it would have passed down to the earth by the gas pipe ; but, upon a visit to the house, we could not learn that even a portion of the charge had taken this course. A sulphurous smell pervaded the atmosphere after the building was struck, and a blue smoke was visible in the room, but none of the inmates were injured, and the property was but slightly damaged. Another house, in the same neighborhood, was struck a few days afterwards, which stood within forty feet of a much higher building, having several lightning conductors upon it. A similar case is related in the Boston *Traveller*, which says :—

"The house of Mrs. George Darling, of Providence, R. I., was struck by lightning during a heavy shower. A daughter of Mrs. Darling was slightly burned on one ear, but beyond this no person was injured. The house was a cottage, surrounded by higher buildings and trees, all of which were spared, in spite of the prevailing idea that lightning always strikes the tallest of contiguous objects."

Electricity discharging from a cloud to the earth, takes the best conductor and the shortest course. We have not heard of a building furnished with a sufficient number of suitable lightning conductors having been struck this season, which is favorable evidence of their utility. High buildings in the vicinity of which a thunder storm takes place, may present a more difficult course for the lightning than lower buildings; in which case the latter is liable to receive a disruptive discharge. The object of a lightning rod is to conduct the electric fluid silently to the earth ; but differences of opinion prevail respecting the area that a conductor will protect. About four hundred square feet of a roof, it is considered, will be protected by a rod ten feet higher than the roof, and extending about two feet above the chimney. According to this rule, one lightning rod should afford protection to most of the houses built on city lots ; and it would be well to provide each with such a safeguard. Some persons entertain the notion that metal attracts lightning, and have contended that lightning rods were more dangerous than beneficial. But metal does not attract lightning ; it merely acts as a conductor, and copper, which is devoid of magnetic power, is, next to silver, the best material that can be used for a lightning rod. A copper rod of one-eighth the sectional area of an iron one will answer just as well for a lightning conductor. Lake Superior copper makes the best electrical conductor ; and should be used in preference to any other metal.

PISTON SPEEDS OF BEAM ENGINES.

At one period of the science of steam engineering it was the practice to fix the limit of the speed of the piston at so many feet per minute ; and from this and the other data usually taken into account—as the area of the piston, pressure of steam, &c.—the horse-power of the engine was calculated. If we are not in error, 250 feet has been set down as a standard speed for pistons ; but modern engineers prefer to drive their pistons as fast as they can with safety, and to disregard rules which experience proves the uselessness of. We have, as a result, the performance of the engine of the *Golden City* (a new steamer belonging to the Pacific Mail Steamship Company). It is of the beam variety ; the beam weighing upward of eighteen tuns. This engine has a

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piston 105 inches in diameter by 12 feet stroke, and upon a recent engineers' trial-trip, achieved the remarkable speed of 420 feet, or 17½ double strokes per minute. We have no doubt that the engine will be able to add materially to this speed, as the machinery was entirely new, it being merely an experimental trip. This is not an isolated case, by any means. The *City of Buffalo*, formerly a passenger steamer upon Lake Erie, now dismantled for the want of trade, had an engine with a cylinder of 76 inches diameter and 12 feet stroke, which drove paddle-wheels 34 feet in diameter, whose floats had 31 inches face, were 11 feet long, and had from 36 to 40 inches dip—19½ revolutions, or 39 single strokes per minute. By a severe exercise of mathemathical knowledge, we ascertain this to be a piston speed of 468 feet per minute. We remember these facts and figures very well, as at that time we were pretty much occupied in looking after the engine aforesaid. The beam weighed nearly sixteen tuns, and was stopped and started thirty-nine times in a minute, working with great ease and certainty. The beam of a beam engine appears to some to be an insuperable obstacle to the general adoption of the class of engines to which it belongs; and its weight, momentum, velocity, &c., are charged heavily to its demerit. These theories, we fancy, are disturbed by the actual facts in the case, which are, that the beam is so poised and balanced on its center that the supposed shock of changing its line of motion is utterly neutralized; and as for the weight—that is supported by the framing, and is no more against the power exerted by the piston than the smoke stack. A beam weighing fifteen tuns, or eighteen tuns, can be moved through any portion of its arc of vibration, by the strength of a man; providing, of course, that the binders of the pillow blocks are not screwed up, and that the journals set fairly on the brass. The above cited cases of the speed of beam-engine pistons are all distanced by the extraordinary performance of the *C. Vanderbilt*, a Sound steamer, in her race, June, 1847. This engine is of 65 inches cylinder and 12 feet stroke, and on the occasion mentioned, attained to 540 feet, or 22½ double strokes per minute. It is not at all uncommon or extraordinary to obtain a piston speed in beam engines, of 400 feet per minute, in this country; but the performance of the *Golden City*, we think, is the best on record, considering the size of the cylinder.

Since writing the above, we have ascertained that all the facts just mentioned are below the mark. The *Mississippi*, a large paddle steamer, having an 81. inch cylinder and 12 feet stroke, has made 24 revolutions per minute, the wheels having 36 inches dip, and attaining a piston speed of 576 feet per minute. The *Metropolis*, a large Sound steamer, having a cylinder of 105 inches diameter and 12 feet stroke, has made 20 revolutions per minute, and we think a higher number. The working beam on the *Mississippi* weighs fourteen tuns; that on the *Metropolis* about sixteen tuns. The engine of the *New World*—a side-wheel steamboat 420 feet long, on the Hudson river, having a 76 inch cylinder, and fifteen feet stroke, has made twenty revolutions per minute, or forty single strokes. The *Richard Stockton*, however, has outstripped the whole fleet, and, we think, attained the highest piston speed for an engine of this class ever made in the world. We do not know the exact dimensions of the cylinder, but have been told it is between 50 and 60 inches, with ten feet stroke. The *Stockton* has feathering wheels, and makes 32 revolutions, or 64 single strokes, per minute; and has done this duty for years, having been built by Robert L. Stevens for the express object of testing the speed at which a piston could safely travel. This is the highest speed within our knowledge ever attained by a piston in an engine of similar size; if any other instances come to mind we shall place them on record. It would be difficult to point out any other class of marine engine of the same size as that in the *Golden City*, which could achieve 17½ turns a minute, and keep it up as a regular duty. The standard of 250 feet per minute will have to be changed, and made to suit modern pistons, as the engines themselves stubbornly refuse to be controlled by any such snail-like movement.

THE English papers state that all the winners at he late rifle matches were blue-eyed men.

PORTABLE ENGINES.

It is astonishing how mankind in general, and farmers in particular, obstinately adhere to the traditions and usages of the past. We allude at this particular time to the substitution of machinery for hand labor. While agricultural implements of all kinds are having a fair trial, we think it not amiss to say a word here in favor of the power that drives these machines—that much-abused animal the horse. We have assumed, broadly, that in most instances the horse furnishes the motive power. This assertion is, we believe, the fact in the case; and it is a state of things which might be changed for the better by the adoption of the steam engine. A machine of this class can be had for about the same price that a pair of first-rate horses will cost; with the advantage that it has, stored up within its brass and iron muscles, the force of three teams; and that it never tires, as flesh and blood does. Not only is this true, but the cost of keeping a pair of horses and that of running a steam engine of two horse power, is not to be compared for an instant. For it must be recollected that the engine will do the work in half the time required by an animal: that it consumes only when actually at work; and is not "eating its own head off" when the earth produces nothing, and man rests from the labor of the summer.

It is our opinion that in every instance where a stationary power can be employed, steam will be found preferable to any other that is used for farming purposes. With the same degree of intelligence that will keep a pair of horses from being ruined, or injured in body and health, the steam engine can be run and kept in order; and as the latter can be wheeled from place to place, there are but few localities where it could not be advantageously introduced. In rocky and hilly countries, in new land—where stumps spread out their roots, and neither use the ground themselves, nor permit the farmer to do so—the steam engine, aided by the proper tools, would soon subdue these intractable obstacles, and clear the way for the seed that comes after.

We think it would be a profitable speculation for some enterprising farmer to introduce a portable engine to his neighborhood, and let it out to his neighbors at a nominal price, so that its practical advantages would be manifested to the most prejudiced person. We are not so enthusiastic as some on this subject; we do not foresee the time when every farmer shall have his portable engine, just as certainly as they all have churns; for such a state of things would be unadvisable. But we do think that for all the rough work about a farm (and of this there is plenty) steam power would be much more efficient and economical than any other in use: and we hope to see sufficient enterprise manifested to enable us to chronicle the advent of many more engines than there are at present on the large farms about the country.

PERPETUAL MOTION.

The Boston *Journal* publishes a letter from a correspondent at Newport, Vt., who describes a "perpetual motion" machine, on exhibition at that place, and states that it is attracting great attention. Mr. Leach, of Vermont, claims to be the inventor. The writer says:—

"It is a simple wheel, runs on gudgeons, and is independent of any outside spring, weight, or power, as a propeller. On the same axle on which the metal wheel is fixed, is a band wheel, on which a band runs over a small pulley that drives a small circular saw. Set it on a table and remove the brake, and it will start itself and run with great velocity, driving the saw. It is the simplest thing in the world, though I cannot intelligibly describe it; but it is at once understood by the beholder. It will not, nay *cannot*, stop without a brake, as it is so fixed by means of balls and arms, that the *descending* side of the wheel is perpetually further from the center of motion than the opposite *ascending*. The most incredulous beholder here is at once convinced, on seeing it, that a wheel can be made its own motive power. The model runs on and runs ever. It is a small wheel, ten inches in diameter, with ounce balls attached to movable arms. Whether an increase in the dimensions of the wheel will increase its power in proportion, remains to be tried; but one thing is certain, it will make Mr. Leach, who is poor, a wealthy man. It is no cheat, no humbug, no Yankee trick, but a stubborn and fixed fact; and ere long the world will be convinced that the principle of perpetual motion ever existed, and has now been discovered by a Green Mountain boy."

It is evident from the above that the fools are not all dead yet. When the laws of nature are so far reversed that water will flow up-hill, instead of down—when men can lift themselves by pulling upon the seats of their pantaloons—then, and not till then, will wheels manufacture their own motive power.

The above device *is* a cheat and a humbug. In principle it is the same as the "perpetual motion" of Willis, exhibited in this city about seven years ago, of which an engraving may be found on page 201, Vol. XI. (old series), SCIENTIFIC AMERICAN. A concealed bellows was the motor in that case, we believe. Several contrivances on the same plan were subsequently exhibited at Barnum's Museum. This Vermont show is probably one of them. Many people have been gulled by these perpetual motions; but we never knew that any of the "gay deceivers" who manage them, have made fortunes. It is to be hoped not, at any rate.

PRIZE EXHIBITION OF FARM ENGINES.

For several years past, much attention has been directed, in England, to improved steam engines for farmers; and an exhibition of such motors was lately held by the Royal Agricultural Society, at Worcester. On this occasion the engines were divided into two classes, namely, fixed and portable. Seven of the first order, none of which were to exceed 10-horse power, competed for prizes. Their power was tested with a friction brake, and a certain quantity of coal was weighed out to each. The amount of coal consumed per horse-power ranged from 4.88 lbs. to 15.32 lbs. per hour. The one which consumed the least coal gained the first prize of £15 ($75).

No less than nineteen portable engines competed for prizes. They ranged from 4 to 12 horse-power, and were divided into three sections, according to their size. The consumption of coal, per horse-power, ranged from 3.59 lbs. to 13.28 lbs., per hour; and the prize, of £10, was awarded to the one which consumed the least fuel. In all the trials, the small engines consumed a proportionally greater amount of fuel than the large ones. The price of each engine was given in to the prize committee. The one which gained the first prize was valued at £230 (about $115 per horse-power). The price of the smallest was £85 (a 4-horse power.) The boilers of all were of the tubular character, and each engine was so constructed, according to the conditions of trial, that it could be easily taken apart, and its valves and pistons inspected. The judges of these trials were, D. K. Clarke, C. E., inspector of machinery in the International Exhibition, and author of a work on railway machinery, G. V. Gooch, C. E., J. Stewart and J. Easton, railway engineers.

APPLICATIONS FOR THE EXTENSION OF PATENTS.

The following persons have applied to the Commissioner of Patents for the extension of their patents for a term of seven years:—

Method of fitting the Heaving Socket and Head of Windlasses,—Charles Perley, of New York city, obtained a patent on the 13th of November, 1849, for a method of fitting the heaving socket and head of windlasses. The said Charles Perley now prays for the extension of the patent.

Binder Pulleys for Belts and Brakes.—Mertoun C. Bryant, of Lowell, Mass, obtained a patent on the 13th of November, 1849, for an improvement in binder pulleys for belts and brakes. Caroline Bryant, executrix, of Lowell, Mass., now prays for the extension of the patent.

The testimony on the above applications will be closed on the 12th day of October next; depositions and other papers relied upon as testimony, must be filed in the Office on or before the morning of that day.

Looms for Weaving Figured Fabrics.—Moses Marshall, of Lowell, Mass., obtained a patent on the 11th of December, 1849, for a loom for weaving figured fabrics, and now prays for the extension of his patent.

The testimony will be closed on the 9th of Novem-

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ber next; depositions and other papers relied upon as testimony, must be filed in the Office on or before the morning of that day.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

Machine for Rolling the Seams of Boots and Shoes.—In the manufacture of boots and shoes, particularly of leather or morocco, it is essential, in order to produce good work, to rub the seams well down on the inner side. Up to the present time this operation has been performed entirely by hand, with great exertion and loss of time. The object of this invention is to perform the operation of rubbing down or rolling the seams, by machinery capable of being driven by other than human power, and the invention consists in the arrangement of a roller arm connected by suitable mechanism with a rotary shaft, and working on a curved or straight bed, which supports the material to be rolled, in such a manner that by imparting to the shaft a continuous rotary motion, the roller assumes a reciprocating rectilinear motion, traveling repeatedly over the seam on the bed; the bed is adjustable, to conform to the shape of different seams, and the pressure is increased or decreased by a simple arrangement of springs. John C. White, of Auburn, N. Y., is the inventor of this machine.

Device for turning Crank Pins.—The object of this invention is to obtain a simple and portable device, so constructed and arranged that it may be readily applied to the driving wheels of locomotives, and in such relation with their crank pins as to admit of the latter being turned and made true, without detaching the pins from the wheels or removing the wheels from the locomotive. Socrates S. Cheney and Danforth Cheney, of Galesburg, Ill., are the inventors of this device.

Paddle-wheel.—This invention relates to paddle-wheels with series of narrow buckets of a parabolic or curvilinear shape. The principal objection to such paddle-wheels as heretofore constructed, has been, that though in the highest degree effective, when rotating in a direction to act upon the water with the convex faces of their buckets to propel the vessel ahead, they fail to operate as well as is desirable when rotating in the opposite direction, and hence cannot be very successfully used in backing the vessel. The reason for this has been that the buckets, in entering and passing through the water, have divided it and pushed it aside, instead of taking hold of it and acting with a direct pressure. The principal object of this invention is to make the wheel more effective in backing; and to this end it consists in dividing the wheel in a plane perpendicular to its axis by means of a partition ring, thus making the buckets of the form of semi-parabolas, and so setting the said buckets between the said partition ring and two outer rings of a depth equal to the depth of a series of buckets, that the buckets on one side of the partition alternate with those on the other side of the partition, by which means not only is the above-mentioned result accomplished, but the wheel is made stronger, and produces less vibration of the vessel when propelling in a forward direction. Addison C. Fletcher, of New York city, is the inventor of this improvement.

Car Brake.—This invention relates to a new and improved railroad car brake, of that class designed to be operated simultaneously on a train of cars, by the engineer or his attendant. The invention consists in the employment of wedges connected by chains or ropes to a shaft, which extends the whole length of the train; the wedges being fitted between drums on the axles of the trucks or the wheels thereof, and inclined plates attached to the trucks, all arranged so as to operate very effectively. Isaac N. Pyle, of Decatur, Ind., is the inventor of this improvement.

Back Numbers and Volumes of the Scientific American

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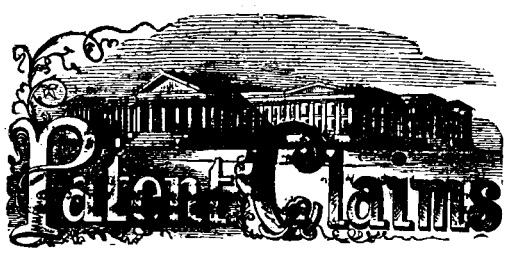

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING AUGUST 11, 1863.

Reported Officially for the Scientific American.

**** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifing size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

39,455.—Breech-loading Fire-arm.—John S. Adams, Taunton, Mass.:

I claim, first, The pivoting of the breech within the frame by means of the rings, b b, or their equivalents, having combined with them the springs, c c, and the false trunnions, f f, the whole applied and operating substantially as herein set forth.

Second, The packing-piece, k, combined with the movable breech by means of the taper screws, m m, substantially as and for the purpose herein set forth.

Third, So constructing and applying the sight, E, that it constitutes a rammer to operate in combination with a movable chambered breech, substantially as and for the purpose herein specified.

39,456.—Refrigerating Apparatus.—J. L. Alberger, Buffalo, N. Y.:

I claim an apparatus constructed substantially as herein described for cooling the air of a closed apartment, by causing it to circulate naturally or unforced through the apartment, and through and in contact with pipes or plates which are artificially cooled by an evaporating fluid and a forced current of air, in the manner substantially and for the purpose described.

39,457.—Universal Chuck.—Manoah Alden, Philadelphia, Pa.:

I claim, first, The combination of the plate, C, and its spiral teeth, with the screw spindle, D, when both are applied to the case, A, of the chuck, and arranged to operate the jaws, a a a, substantially in the manner described.

Second, The combination of the jaws, a, pins, d, and plate, C, with its curved slots, the whole being constructed and arranged within the case substantially as described.

39,458.—Steam Engine.—John Baird, New York City:

I claim, first, In combination with a piston and a cylinder, a stationary rod or rods passing through the piston, and operating substantially as specified, the combination being substantially such as described.

Second, I claim a bush or sliding block and appropriate packing in combination with a piston, a stationary rod and a cylinder, the whole acting substantially in the manner and for the purpose set forth.

Third, I claim in combination a cylinder, a piston, and a stationary rod operating in combination as described, where the latter is likewise combined with the cylinder covers or heads as described, whereby the rod performs the double duty of sustaining the piston and the cylinder heads, substantially as set forth.

39,459.—Dish-heater.—William Brand, Burlington, Iowa:

I claim, first, The combination of chambers, G B, with a stove or stoves, A, and steam-pipes, h h, and domes, g g, the whole constructed and operating substantially as and for the purposes described.

Second, In combination with the horizontal chambers or box herein described, the adjustable standards or legs, k k, for the purpose of keeping the water pan level as set forth.

Third The arrangement of stoves, A A, beneath a shallow horizontal box constructed with the dish-holding plate, C, water chamber, G, smoke chamber, B, and a direct steam and smoke escape flue, b, substantially as described.

39,460.—Ambulance.—Clarissa Britain, Saint Joseph, Mich.:

I claim, first, The removable slotted posts, B, in combination with the transverse bars or rails, G G', springs, H, holding-down bars, J J, and wagon body, A, all arranged and operating substantially as and for the purposes described.

Second, Suspending the stretchers, E E, upon poles, c c, arranged and supported upon springs substantially in the manner herein described.

39,461.—Fastening for Studs or Buttons.—Laura M. Bronson, New York City. Ante-dated Dec. 31, 1862:

I claim the ring or S-shaped wire of metal with the cross bar and countereye as shown, and for the purposes set forth as specified.

39,462.—Invalid Back-rest.—William Felix Brown, New Bedford, Mass.:

I claim my improved invalid back-rests as made of a cushioned frame, D, a series of helical springs, F F, an auxiliary frame, E, a covering of cloth or rattan, b, and the two frames, A B (hinged together and provided with a latching apparatus), arranged in manner and so as to operate as specified.

39,463.—Grain Binder.—W. W. Burson, Atkinson, Ill.:

I claim, first, The combination of the wire-lever, A, and double grooved supports, B B, overhanging the gavel, constructed and operating substantially as described.

Second, The combination of the slide, D, cam-rod, I, and lever, A, acting substantially as described and for the purpose set forth.

Third, The combination of the spring-rod, x, and coil spring, Y, with lever, A, and slide, D, acting as set forth.

Fourth, The combination of the spring pliers, b, slide, D, and twisting claws, e, substantially as described.

Fifth, The combination of the ratchet rods, L L', ratchet pulley, M, springs, O O', and lever, A, acting substantially as described, and for the purpose set forth.

Sixth, The combination of the spool, G, wire-covering belt, H, and bar, Q, substantially as set forth.

Seventh, The combination of the crank, P, spring, U, rod, m, drop catch, W, and wheel, T, acting substantially as described.

Eighth, The combination of the hook, a, cam, d, and pliers, b, acting substantially as described and for the purpose set forth.

39,464.—Grain Fork.—H. M. & W. W. Burson, Atkinson, Ill. Ante-dated July 3, 1863:

We claim, first, Attaching to a grain fork, the clasp, C, for the purpose set forth.

Second, The combination of the handle, A, fork, B, clasp, C, and pitman, D, acting substantially as described and for the purpose set forth.

39,465.—Lathe for turning Locomotive Crank Pins.—S. S. & Danforth Cheney, Galesburg, Ill.:

We claim the plates, A D, in connection with the revolving tool or cutter frame composed of the ring, t, disk, r, and rods, s, and provided with a sliding head, H, having a tool stock, a', attached to it and operated through the medium of the screw, v, star-wheel, v', and pin, w, all arranged to operate substantially as and for the purpose herein set forth.

39,466.—Grain Dryer.—M. C. Cogswell & A. G. Williams, Buffalo, N. Y.:

We claim an orifice or opening made at the side of the case, in such a manner that it will open upwardly and prevent the grain from passing out, and at the same time increase the pressure and effectiveness of the air within; and also allow the evaporation, dust, air, &c., to escape, substantially as set forth.

We also claim the jacket B (with or without its lid, b'), in combination with the case, A, for the purposes and substantially as described.

39,467.—Cane Mill.—D. M. Cook, Mansfield, Ohio:

I claim, first, The matching circular wedges arranged on and constituting the splintering and expressing surfaces of a roller-cane mill, substantially as and for the purposes set forth.

Second, A roller-cane mill constructed to operate upon the cane with the one series of interlocking rolls, in the manner set forth.

Third, Splintering cane, expressing the juice therefrom, driving the ungeared rolls and relieving the journals of the rolls, by means of circular wedges, as set forth.

Fourth, The combination of the rollers, director, C, and scraper, f, all constructed and arranged substantially as described.

39,468.—Fastening for Skates.—C. T. Day, Newark, N. J.

I claim operating or adjusting the bars, D, which have the jaws, d, at their ends through the medium of the circular plates, E, arranged so as to turn on pivots, g, and provided with eccentric slots, f, into which pendent pins, e, at the inner ends of the bars, D, are fitted, substantially as and for the purpose set forth.

I further claim holding the plates, E, and consequently the jaws, d, in proper position by means of the pendent screws, j, attached to the plates, C, and passing through concentric slots, i, in the plates and having thumb nuts, F, fitted on them substantially as described.

[This invention relates to an improved fastening for securing the skate to the boot or shoe, and of that class which are composed of jaws for clamping or grasping the sole and heel of the boot or shoe The invention consists in an improved means for operating the clamps or jaws, whereby the same may be readily adjusted so as to grasp the sole and heel of the boot or shoe firmly and also readily detached or moved therefrom, and firmly held in position when grasping the sole and heel.]

39,469.—Let-off Mechanism for Looms.—George Draper, Milford, Mass.:

I claim a combination consisting not only of the escapement detent lever, k, its wheel, i, and the apparatus as described for depressing or operating such detent lever, but of a stopping mechanism (viz., the lever, G, and its connecting rod, I), to be operated by the lay, or while the lay may be beaten up, the whole being arranged substantially as and for the purpose specified.

39,470.—Construction of Sheet Metal Tanks.—Alfred Edwards, Chicago, Ill. Ante-dated May 18, 1863:

I claim not only the construction of a receptacle with a double bottom, by means of cutting and bending two pieces of the material, &c., in the manner as set forth and described, but also by means of cutting and bending any number of pieces according to the size and shape of the receptacle; the pieces in all cases to be laid crosswise on each other, so as to form a bottom of two or more thicknesses.

39,471.—Lighting Street Lamps.—Hosea Elliot, New York City:

I claim the arrangement of the tilting lamp, A, in combination with the case, C, self-closing door, d, pole, B, and thumb-piece, D, all constructed and operating in the manner and for the purpose substantially as shown and described.

[This invention consists in the arrangement of an adjustable lamp attached to a rod or pole which is provided with a thumb-piece and with a case enclosing the lamp in such a manner, that by depressing the thumb-piece the lamp is tilted and the door of the case enclosing the lamp is thrown open, allowing the flame of said adjustable lamp to come in contact with the burner of a street lamp, and obviating the necessity of climbing up on a ladder in order to light said street lamps, or other lamps or lights which cannot be reached from the ground.]

39,472.—Treating Night Soil for Agricultural Purposes.—R. B. Fitts, Philadelphia, Pa. Ante-dated Dec. 19, 1862:

I claim the process herein described and specified, for the purposes set forth.

39,473.—Paddle Wheel.—Addison C. Fletcher, New York City:

I claim the construction of a paddle wheel with alternating narrow semi-parabolic or curvilinear buckets, D E F, arranged in series as described and rings, C C C', outside of and between the said buckets, the whole combined and arranged substantially as herein described.

39,474.—Welt-guide for Sewing Machines.—Hannibal Folsom, Milford, Mass.:

I claim in combination with the gage, B, the welt-guide, C, made with the bearing surfaces, a b c, and with a spring, g, or its equivalent for keeping the welt in lateral position, and for creating tension upon it as set forth.

39,475.—Potato Digger.—E. T. Ford, Stillwater, N. Y. Antedated Oct. 28, 1862:

I claim, first, The combination and arrangement of the two rotating wheels, one armed with teeth, a a a a, the other with scraper blades, K K, separately or combined, the frame, C C, and the divider, D, all constructed and operating substantially as and for the purpose above described.

Second, And in combination with the above, I claim the arrangement of the yoke, G, plows, F F, flange, S v, lever, H, gage bar, i, double flange, Y, and driving wheels, A A, as and for the purpose above described.

39,476.—Mounting Artificial Teeth.—John C. Fuller, Chicago, Ill.:

I claim, first, Constructing a platina or other metallic base plate for the teeth and gums with grooves and hooks, or other suitable auchorages in the trough of this plate, substantially as described.

Second, The combination of continuous porcelain gum, a, having the teeth, b, affixed therein substantially as described, with a vulcanized rubber base substantially as and for the purposes herein described.

39,477.—Spur for Horsemen's use.—Thomas Garrick, Providence, R. I.:

I claim the improved spur for horsemen's use described, consisting of a spur with a screw shank, D, and a compressing and supporting clamp, B, provided with the spur points, a a a, or their equivalents substantially as and for the purposes specified.

39,478.—Dumping Wagon.—R. W. Green, Bradford, Pa.:

I claim the box or body of the dumper, constructed with circular sides, J J, and hinged sections, M M, in combination with the pivoted frames, K K, all arranged and operating substantially as and for the purposes specified.

39,479.—Breech-loading Fire-arm.—Henry Gross, Tiffin, Ohio:

I claim, first, As an auxiliary device to a breech-loading fire-arm operating substantially as described, the pivoted guide, E, working in the slot, D, and maintaining during its up and down movement in the path of a circle a close relation between its forward end and the breech end of the gun barrel, substantially as and for the purpose set forth.

Second, Connecting the plug-carrier, F, to the guide, E, substantially as described.

Third, The construction of the slot, D, with its face, a, concentric with the axis, a', of the guide, E, in combination with the auxiliary device, E, and breech-piece, F c, substantially as and for the purpose described.

Fourth, A breech piece, F, with plug, c, on its front end, made so as to receive an eccentric within it and to wholly encircle the same, and also to admit a wedge segment, J, in rear of it, and likewise to admit a guide, E, above it, all substantially as and for the purpose set forth.

Fifth, The combination of the guide, E, sliding segment, F, and eccentric, G, substantially as described.

Sixth, The combination of the lever, H, segment, J, eccentric, G, breech piece, F c, space closing device, E, and peculiarly formed slot, D, substantially as and for the purpose set forth.

39,480.—Manufacture of Water Gas.—W. H. Gwynne, White Plains, N. Y.:

I claim passing steam super-heated or otherwise through melted metal or ores, for the purposes described and shown.

39,481.—Filling Molds with Vulcanizable Gums.—Joseph Charles Howells, Washington, D. C.:

I claim the introduction of vulcanizable gums into molds or flasks by injection, substantially as set forth and by the apparatus herein described or its equivalent.

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39,482.—Secret Pockets for Wearing Apparel.—Joseph Charles Howells, Washington, D. C.:

I claim a secret lapelled pocket to be worn in garments substantially as specified and herein set forth.

39,483.—Gang Plow.—H. R. Huis, Haywards, Cal.:

I claim the peculiar arrangement, construction and application of the axle, D, and arm, E, the slotted oval, a, and the spring slide and lever, A B, for the purpose herein specified and described.

39,484.—Smoothing Iron.—Richard Kuhfs, Saint Louis, Mo.:

I claim the arrangement and combination of the body, A, spaces, a, hinged lid, B, and grate, g, all being constructed, arranged, and adjusted to operate substantially as herein shown and specified for the purposes set forth.

39,485.—Piston Valve for Steam Engine:—Robert H. Lecky, Allegheny, Pa.:

I claim the arrangement of the open end side pipe or steam chest, C, heads, g g, and F F, on the valve rod, E, exhaust openings, h h, and steam ports, i i, the whole being arranged, constructed, and operating substantially as herein described and for the purpose set forth.

39,486.—Padlock.—Conrad Liebrich, Philadelphia, Pa.:

I claim the lever, D, in combination with the shackle, B, and the spring, n, or its equivalent, when the said lever is formed and hung to the lock, substantially as set forth for the twofold purpose of throwing up the shackle when the bolt is withdrawn from the same, and of retaining the bolt when withdrawn as described.

I also claim forming on the lever, D, a projection, t, arranged substantially as described, so as to serve the purpose of a crossward.

39,487.—Artificial Arm.—Marvin Lincoln, Malden, Mass.:

I claim applying to an artificial arm a detachable hand made capable in itself of holding and grasping in the manner as set forth, and of being removed for the attachment of a hook or other instrument by the mechanism described.

I also claim the combination of hinges, i, joints, h, spring, s, and cord, t, applied to the thumb as set forth.

I also claim combining with the solid and rigid fingers, a movable or spring thumb, arranged and operated with respect to the hand as above described.

I also claim giving to all or part of the fingers when made of solid and rigid construction as described, a curved hooking form, for the purpose specified.

I also claim applying a locking mechanism, substantially as described, to operate in connection with the parts, B C, for the purpose of locking the forearm in position.

I also claim combining in an artificial hand a spring thumb and rigid fingers, having a grasping function with fingers having a rigid and hooking form, to give them a holding function as set forth.

39,488.—Lamp.—Louis Loeffler, East Cambridge, Mass., (citizen of Prussia):

I claim the combination of a lamp or burner, a piece of spongy platinum, or its equivalent, and an apparatus for the generation of hydrogen gas, and discharge of such gas, on the said piece of spongy platinum, the whole being substantially as and for the purpose above specified.

39,489.—Washing Machine.—J. H. Mallory, South Bend, Ind.:

I claim the cylinder, B, having its periphery fluted longitudinally, in combination with the polygonal rollers, C, attached to curved or segment bars, g h l, and the latter connected together and to the yielding bars, D, said parts being placed at one or both sides of the cylinder, B, and all arranged as and for the purpose specified.

[This invention relates to an improvement in that class of clothes-washing machines, in which a rotary fluted cylinder is employed in connection with pressure rollers. The object of the invention is to obtain a machine of the kind specified, which will cause the clothes to be operated upon with a more equal and uniform pressure than hitherto, the pressure at the same time extending nearly or quite around the entire circumference of the fluted cylinder.]

39,490.—Apparatus for Evaporating Saccharine Liquids.—James A. Morrell & Peter Bargion, Richmond, Ind.:

We claim, first, The combination of the strainer, M, polygonal divisions, R R, and pan, B.

Second, We claim the arrangement of the pan, B, with its polygonal divisions, R R, in combination with the pans, C C, when used in combination with the chambers, A51 A51′ A52, damper, K, openings, A1 A2, and y z, and I I and U.

Third, We claim the arrangement of the chambers, A51 A51 A52, in combination with the damper, K, and openings, A1 and A2, and y and Z, and the dampers, I I and U.

Fourth, We claim the combination of the cooler and filtern when constructed, arranged and operated substantially as above described.

Fifth, We also claim the tank, D, when used in combination with the pans, B and C C, and chambers, A51 A51 and A52, damper, K, openings, A1 A2, and y and Z, and I I and U, the whole being arranged, constructed, and operated substantially as above described.

39,491.—Farm Gate.—Ezra Nicholson, East Rockport, Ohio. Ante-dated April 18, 1863:

I claim the arrangement of the spring latch, i, under the hinge lever, a, in combination with the notched segment, h, and stop-plate, q, the bell-crank, k, and levers, d and a, operating in the manner as and for the purposes herein set forth.

39,492.—Meat-cutter.—August Nittinger, Philadelphia, Pa.:

I claim, first, Any convenient number of reciprocating blades, K, and the block, N, when such an intermittent rotary motion is imparted to the said block, that the latter is stationary when the blades are acting on the meat.

Secondly, The worm, U, having a thread partly straight and partly spiral, as described, for the purpose of imparting an intermittent rotary motion to the block, N, through the medium of the gearing herein described, or any equivalent to the same.

Thirdly, The crosshead, i, with its blades, K, when the said crosshead is arranged to turn in the sliding block, b, substantially as set forth, for the purpose herein specified.

Fourthly, The grooved retaining pin, M, passing through the sliding block, b, and crosshead, M, in combination with the spring latch, L.

39,493.—Smoke Stack for Locomotive Engines.—Charles P. Noble, Chicago, Ill.:

I claim, first, The globular or swelled pipe, D, when the inner surface is continuous, and is provided with the projections, a a, and when its discharging orifice or mouth, C, is contracted nearly or quite to the diameter of the pipe, A.

Second, The combination of the swelled pipe, D, deflecting head, E, rods, c, and teeth, a, with the pipe, A, substantially as set forth and specified.

39,494.—Breech-loading Fire-arm.—John Percy, Albany, N. Y.:

I claim, first, The construction of the neck of the stock of a gun with a chamber which has segmental seats for the triggers, a removable plate, J, and a perforated diaphragm, a, in combination with the lock and hammer mechanism which is arranged and operates substantially as described, the whole constituting a device which is sufficiently water-proof for all practical purposes, as set forth.

Second, In combination with the solid shield or diaphragm, a, pivoted hammer, e, and breech-loading barrel, D, the water-tight lock chamber formed in the casting or portion, B C, substantially as described.

39,495.—Railroad Car Brake.—Isaac N. Pyle, Decatur, Ind.:

I claim the wedges, F F′, in combination with the continuous shaft, G, and inclined plates, E E′, the latter being placed in the relation as shown, with the wheels, C, or drums, a, attached to the axles, D, thereof, and all arranged as and for the purposes herein set forth.

39,496.—Ratchet Drill.—Edward A. Raymond, Brooklyn, N. Y.:

I claim the tool-holder, a, ratchet, d, pawl, g, and stock, e, constructed, combined and arranged as specified.

39,497.—Rake for Harvesters.—C. D. Read, Hamilton, Ohio:

I claim, first, The combination of a reciprocating rack, m, with a toothed segment, k, oscillating rake shaft, K, slide rest, J, and arresting screws, h h′, substantially as described.

Second, The combination of adjustable crank-arm, e, pitman, G, and adjustable arresting screws, h h′, substantially as described.

Third, The toothed spring, L, in combination with the reciprocating rack, m, and inclined projections, p′ p″, on the slide rests, J, operating substantially as described.

Fourth, The combination of cam, s, on rake-shaft, K, lever, t, lever, c′, and pulley, b, with a clutching device applied to the driving shaft, a, all arranged and operating substantially as described.

Fifth, Releasing the lever, c′, by means of a cam, s, applied to the rake-shaft, substantially as described, so that the rake can only be stopped, while the machine is moving forward, at the terminus of its backward stroke.

Sixth, The combination of the reciprocating rack, m, toothed segment, K, oscillating rake-shaft, K, and slide-rest, J, arranged and operating substantially as described.

39,498.—Water Wheel.—Robert Safely, Cohoes, N. Y.:

I claim the hollow beam, H, in combination with the stuffing box, J, and the oil cup, O, arranged and fitted substantially as described and for the purposes set forth in this specification.

39,499.—Circular Knitting Machine.—Daniel Scattergood, Nottingham, England. Patented in England Nov. 3, 1862:

I claim the employment, in circular frames, or roundabouts, of a cone and conical supports or bearings for the needle jacks or carriers, so as to afford them a continuous bearing whatever the diameter of the circle of needles, and imparting motions to the loop and dividing landing, and knocking over wheels so that they shall perform their usual functions, whatever the diameter of such circle, all substantially in manner hereinbefore described, whereby fashioned or narrowed work may be produced and finished, as far as the fashion is concerned, before being removed from the frame.

39,500.—Vacuum Box of Paper-making Machines.—J. L. Seaverns, Worcester, Mass.:

I claim the combination with the vacuum box of a paper machine of a series of rolls supported in stationary bearings at each end inside of said bearings, with a movable cheek paked where the rolls pass through it, when said cheek is made continuous, or to fit closely in and against the sides of the box, as set forth.

Also, in combination with the rolls of a paper machine vacuum box, means for adjusting the hight of the stationary bearings, for the purpose specified.

39,501.—Gun Lock.—J. Hamilton Shapley, Exeter, N. H.:

I claim the sere and the nose of the sere and all its parts, which are above fully described, or their equivalent, and the mode of using or applying the same.

39,502.—Mortising Machine.—Henry C. Smith, Clarksville, Ohio:

I claim, in the described combination with the mortising sash, D, and its accessories, the compound or right-and-left ratchet wheel, G G′, pawls, H and H h, feed hand L l, rod, P, hooked nut, Q, and dog, R, or their equivalents, substantially as set forth.

39,503.—Record Book.—William H. Somers, Urbana, Ill.:

I claim the method of opening and closing the same with the record by means of the lever, A, operating to close the drawer by the act of sliding into the case, substantially as shown and described.

39,504.—Nut Machine.—Leopold Thomas, Allegheny City, Pa.:

I claim, first, Compressing, swaging and punching nuts in a cavity which has for its sides the vibrating shear blocks, m, in its ends the stationary perforated die, h′, and the movable perforated die, h, and its top and bottom, the portions o and v, all constructed, arranged and operating substantially as described.

Second, The combination of the reciprocating punch carrying bar, f, with the perforated reciprocating die block, h, bar, g, and cheek pins, j, arranged and operating substantially as described.

Third, Transmitting a reciprocating motion to the punch bar, f, by means of links, w w, and vibrating levers, k k, which carry the cutting and closing blocks, m m, substantially as described.

Fourth, The vibrating arm, u, carrying on its upper end a block, v, which constitutes, when in a horizontal position, the bottom of the cavity in which the nuts are swaged and punched, in combination with the stationary die h′, and moving die, h, substantially as described.

Fifth, The reciprocating perforated die block, o h, so arranged with reference to the dies, h′ v, as to form the top and one side of the cavity in which the nuts are swaged and punched, and combined with the levers, k k, punch bar, f, and links, w w, so that after the nuts are punched they may be discharged from the punching tool, substantially as described.

Sixth, The combination of vibrating arms, k k, link connections, w w, cross arm, x, spring, y, punch bar, f, and sliding die block, h, substantially as specified.

Seventh, The combination of the reciprocating die-carrying bar, g, with the reciprocating punch bar, f, stop pin, j, vibrating arms, k k, links, w w, and pendent guides, d d, substantially as herein described.

39,505.—Fire Escape.—Thomas Thompson, Baltimore, Md.:

I claim the curved flange, D, on the risers, in combination with the hollow standard for supporting the steps, as described.

I also claim supporting the steps with the curved flanges, D, and hollow standard, by fastening the rear edge to the lower edge of the riser above, and letting the front edge rest on the riser below.

39,506.—Harness Snap.—James B. Tibbits, Palmyra, N.Y.:

I claim the employment or use, in combination with the main portion or body, A, of a harness snap provided with a hook, a′, and an eye, a, of a tongue, C, pivoted to the part, A, and provided with an eye, f, all arranged as herein described.

[The object of this invention is to obtain a snap for the breast straps, and other parts of the harness where applicable, which will operate perfectly without the aid of a spring, which is liable to get out of order. To this end, the invention consists in forming the snap with a tongue, which is attached to the snap by a pivot, and having said tongue provided with an eye, through which the strap passes, the strap also passing through an eye on the main portion of the sweep; the several parts being so arranged that the pull or weight of the strap, will keep the tongue closed or in proper relation with the main portion of the snap, so that the latter cannot become casually detached from the part to which it is connected.]

39,507.—Churn.—John Tingley, Waterford, N. J.:

I claim, first, The clamping hoop, C, operated by the lever, M, link, N, and plate, I, or their equivalents, substantially as described; and

Second, The head, B, provided with the groove, E, and the elastic strip, F, or their equivalents, in combination with the clamping hoop, the lever, the link and the plate, as above described.

39,508.—Cooking Stove and Range.—W. B. Treadwell, Albany, N. Y.:

I claim, first, The open fire pot, B, constructed as described, in combination with an iron or soap-stone backing, arranged substantially as described.

Second, Openings, i l, chambers, k C E D3, and deflector, m, of the oven, D, all arranged and operating substantially as described.

Third, The arrangement of flues, Y G2 G1 G3 k′, in combination with opening, i, and oven, G, operating substantially as described.

Fourth, The combination of the space, 2, between the open fire pot and the backing thereto with the dampers, m′ m′ m′, so that the combustion of the fuel may be retarded, or regulated, by a counter or upper current outside of the fire-pot, substantially as described.

Fifth, The combination with a range or stove, and the doors thereof, of the button fastening, consisting of a fixed screw pin, n, plate, p, button, n′, and nut, p″, substantially as described.

Sixth, The combination with a range or stove and the doors or windows thereto of the mica frame, H′, r s, constructed as represented, and the button fastening, n n′, and p p″, all substantially in the manner and for the purposes set forth.

39,509.—Fruit Dryer.—J. H. L. Tuck, St. Charles, Ill.:

I claim a fruit-drying case, formed of a shallow box, A, having ventilating openings at its sides, and provided with a glazed sash, B, for a top, and with folding legs or props, D D, one at each side, and used in connection with a stake or post, C, substantially as described,

[The object of this invention is to obtain a simple and economical device for drying fruit, one which can be readily adjusted so as to receive the sun properly, be perfectly ventilated, and the fruit thoroughly protected from the weather.]

39,510.—Binding Attachment to Harvesters.—Alexander Underwood, of Kenosha, Wis.:

I claim, first, The self-acting shifting levers, E and D, operated by the cams or inclined planes, m and n″, on the wheel, K, and the cam, 7, on the wheel, L, all as herein described.

Second, The arm, B, provided with the cam groove, m2, in its rear half, the friction rollers, s2, on the forward part, and the mortise, L, near the center, and operated substantially as explained.

Third, The combination of the arm, B, forked lever, A, shaft, U, stud, e2, guide rollers, k2 s2, and ways, f2, all constructed and arranged in the manner and for the purposes described.

Fourth, The combination of the spiral cam, H, rack, R, pinions, T b2 c2, swinging hanger, a2, yoke, h, pin or roller, d4, and cam-grooved gear wheel, F, when the said parts are constructed and arranged as herein described, so as to impart a reciprocating motion to the arm, B, by a continuous motion of the cam and gear wheel, F.

Fifth, The combination of the hooks, l2, r, radially slotted pinion, o2, sliding bar, C, and shear blades, h3 and n, when the said parts are constructed and arranged in the manner hereinbefore described, so as to adapt them to uniformly twist and subsequently knot and sever the band.

Sixth, The stud, k, operated by the sliding bar, C, and employed in the described combination with the shear blades, h3 and n, to hold the said blades in close proximity and retain the end of the cord, as explained.

Seventh, The combination with the gear wheel, G, sliding bar, C, stud, k, and blades, h3 and n, of the roller, s′, grooves, s g′, shifting, curved, inclined plane, t, and spring stop, z, operating as explained, to impart an alternate motion to the bar, C, to sever the cord on one or the other branch of the blade, n.

Eighth, The combination with the gear wheels, I F and G, of the clutch pinion, V, clutch, J2, cams, f′ o, lever, g2, and dog, r2, whereby an intermittent motion is imparted to the wheel, G, and the dog, r2, inserted in and retracted from a notch therein, as explained.

Ninth, The combination with the gear wheel, G, pinion, o2, and hook, l2, of the lever, h′, rack, d′, pinion, e′, connecting rod, k3, rock shaft, u2, hook, w2, and finger, l; operating in the manner described to catch, loop and tie the ends of the cord around the sheaf.

Tenth, The hook, i2, operated by the cam, l′, lever, k′, and rod, n′, to draw down the cord, in readiness for the next sheaf, as explained.

[The machine is entirely automatic in its operation, taking the grain directly from the cutters and delivering it in securely bound sheaves of any required size.]

39,511.—Harvester.—William Van Anden, Poughkeepsie, N. Y.:

I claim, first, Supporting the frame of a reaping or mowing machine in such a manner that its weight, together with that of the cutting apparatus, will be supported on, or sustained by one wheel of a double wheel machine (when the wheels are used together for the purpose described) by means substantially as set forth.

Second, Making the main draft frame, A, to counterbalance the weight of the cutting apparatus in a double wheel machine, when both the cutting apparatus and the draft frame are supported upon the propelling wheel, C, and this wheel made to serve as the fulcrum of both, substantially as described.

Third, So supporting the main draft frame, A, upon the tapering axle, c, of the wheel, C, that the "outer" wheel, D, is allowed to rise and fall, in surmounting obstacles, without tipping, or otherwise affecting either the wheel, C, or the position of the cutting apparatus, substantially as described.

Fourth, The elongated stirrup, G, in combination with frame, A, vibrating axle, B, and short axle, c, substantially as described.

Fifth, The wheel, C, arranged upon a tapering tubular axle, c, substantially in the manner and for the purposes described.

Sixth, Supporting the main draft frame, A, upon a short tubular axle, c, at one side, and guiding said frame in its vibrating motions, by means of the stirrup, G, and box, j, substantially as described.

Seventh, In combination with a draft frame, supported and balanced substantially as described, the tongue or pole, J, pivoted to the vibrating axle, B, and supporting the driver's seat, K, arranged substantially as described.

Eighth, The combination, with the oscillating frame, A, supported and controlled in its motions, as described, of the auxiliary axle, B, and wheel, D, substantially as described.

Ninth, Pivoting the "inner" shoe, m, of the finger-bar, V, to the frame, A, by means of the tubular connection, l, fixed rod, K, and front and rear supports, H H′, and central support, n, substantially as described.

Tenth, Keying the main drawing spur wheel, E, to the tubular axle, c, and connecting said wheel to the fulcrum wheel, C, by means of a ratchet and detent, or their equivalents, substantially as described.

Eleventh, The two large supporting wheels, C D, in combination with the auxiliary oscillating axle, B, and oscillating frame, A, arranged and operating substantially as described.

39,512.—Wringing Machine.—Sylvenus Walker, Boston, Mass.:

I claim the employment or use, in clothes-washing and wringing machines, of india rubber, or other elastic pressure rollers arranged in a suitable frame, in connection with wooden or other rigid rollers, in such a manner that the latter will keep the former in proper position and communicate motion to the same, substantially as herein set forth.

[This invention relates to an improved clothes-washing and wringing machine of that class in which india-rubber, or other elastic pressure rollers, are employed. The object of the invention is to obtain a clothes-washing and wringing machine, of the class specified, which will be more durable and more economical to construct than those previously made.]

39,513.—Window-sash Stopper.—James Warren, New York City:

I claim the combination of the whole of the above-described machinery, and its appropriation to the purposes herein specified.

39,514.—Heel Iron and Ice Calk.—William Weaver, Nashua, N. H.:

I claim the double sliding wedge, D, used for the purposes and in the manner as herein set forth.

I do not limit my claim to the particular form of wedge, as herein shown, but extend it to any other, substantially the same.

39,515.—Rolling Seams of Boots and Shoes.—John C. White, Auburn, N. Y.:

I claim, first, The employment or use of the reciprocating roller arm, E, and stationary bed, F, when said arm connects by suitable mechanism with the rotary shaft, C, or its equivalent, substantially as and for the purpose specified.

Second, The arrangement of the adjustable roller, j, and spring roller, n, in combination with the roller arm, E, and bed, F, constructed and operating substantially as and for the purpose set forth.

Third, Making the outer part, o′, of the bed, F, adjustable by a set screw, p, or other equivalent means, as and for the purpose described.

Fourth, The arrangement of the swivel clamps, q, in combination with the bed, F, constructed and operating in the manner and for the purpose substantially as specified.

39,516.—Equalizing Draught in Horse-powers.—James Wilkinson, Prophetstown, Ill.:

I claim the supplemental sweeps, C, sweeps proper, B, cords or chains, E, and rods, d, combined and arranged to operate in the manner as and for the purpose herein set forth.

[This invention is designed to be applied to that class of horse-powers which are provided with sweeps to which the horses are attached. The invention consists in the employment or use of supplemental sweeps, which are attached by pivots to the driving shaft of the device, and have the whiffle-trees attached to them, and are also connected with each other and with the sweeps proper in such a manner that the draught of the several horses will be equalized.]

39,517.—Draught-equalizing Attachment.—James Wilkinson, Prophetstown, Ill.:

I claim the combination of the double-tree, B, two pairs of whiffle-trees, D D′, traces, F F′ G G′, and neck-yoke, E, all arranged to operate as and for the purpose herein set forth.

[This invention consists in a novel arrangement of whiffle-trees, draught-pole, double-tree, neck-yoke and traces, whereby the draught of the animals is rendered equal, or the horses made to pull equally in drawing the vehicle along.]

39,518.—Rail Capstan for Ships.—W. H. Willard, Cleveland, Ohio:

I claim the herein described construction and arrangement of a rail capstan and haul post, when the several parts are arranged and operated as and for the purpose specified.

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39,519.—Fertilizer or Manure.—G. F. Wilson, East Providence, R. I.:

I claim the compound fertilizer obtained by the admixture of the above-described bone-sulphate-of lime, with the ammoniacal and other bodies condensed in the distillation of bones.

39,520.—Gate.—Walter Worth, of Jackson, Mich.:

I claim the arrangement of the notched post, A, slide rack bar, B, hinged gate, D, loops, f, and stop, g, substantially as and for the purpose described.

39,521.—Tinsmith's Fire-pot.—William Yapp, of Cleveland, Ohio:

I claim the combination with the rectangular box or casing, A′, of one or more longitudinal cylinders, A, grate, B, openings, C E, doors, D H, and sliding drawer, K, all arranged as and for the purposes specified and adapted for completely preventing circulation of air when required.

[This is a convenient portable apparatus for heating the soldering coppers of tinsmiths. The copper is preserved from direct contact with the fire, except when it is necessary to remove a defective face, and by this means the work may be performed with greater rapidity, economy and ease.]

39,522.—Paddle Wheel.—T. S. Bigelow (assignor to himself, L. E. Porter and S. M. Rowe), Lake Mills, Wis.:

I claim, first, Providing the prolonged float-shafts and the arms, f, with the anti-friction rollers, c c′, when used in combination with the grooves, a a′, and the projections or grooves, b b′, arranged and operating as and for the purposes herein shown and described.

Second, I claim the combination and the arrangement of the frame, C, the floats, F, provided with fixed and prolonged shafts, as shown, the arms, f, and the anti friction rollers, c c′, with the outer frame, A A′, provided with the peculiarly arranged circular grooves, a a′, all operating substantially as and for the purposes shown and specified.

Third, I claim the combination and arrangement of the floats, F, provided with the prolonged fixed shafts, as shown and described, the arms, f, the anti-friction rollers, c c′, the endless chain, G, and drive wheels, D D, with the grooves, a a′, and projections or grooves, b b′, as and for the purposes herein delineated and set forth.

39,523.—Machine for Shaving Canes for Weavers' Reeds. Joseph Church, Chester, Ohio, assignor to J. N. Rathbun and E. F. Branch, Rutland, Ohio:

I claim the series of pairs of feed rollers, C C′, in combination with the cutters, G H H I, and plates, E, provided with the channel, c, all arranged substantially as shown, to operate in the manner as and for the purpose herein set forth.

39,524.—Lamp-burner.—Joseph Dodin, Brooklyn, N. Y., assignor to James Edgar, of Bergen, N. J.:

I claim, first, The particular shape of the plate of metals, figures 3 and 4, with their openings, e.

Second, The shape of the plate, figure 5, with the mode of fastening it to the plate, figures 3 and 4, at a, figures 3, 4 and 5.

Third, The shape of the plate, figure 6.

Fourth. The mode of fastening the cone, b, figure 1, to the base, G, figure 2, substantially as described.

39,525.—Manufacture of Manure.—Phillip Eley (assignor to himself and R. B. Fitts), Philadelphia, Pa.:

I claim the process or method herein described, of treating night-soil for agricultural purposes.

39,526.—Harvester.—D. L. Emerson (assignor to Mary Manny), Rockford, Ill.:

I claim the combination of the grain wheel directly with the back beam of the harvester, as set forth, so that the employment of a cross-bar connecting the grain ends of the finger beam and back beam, for the purpose of connecting the grain wheel arm or axle with the finger beam and back beam, is unnecessary.

I also claim the combination of the grain ends of the finger beam and back beam, without a connecting cross-bar, by means of a removable raking platform or its appurtenances, substantially as set forth.

I also claim the combination of the front end of the reach, the tongue and the caster wheel, in such manner that the machine may be used interchangeably with a stiff tongue laterally or a limber tongue, by shifting the connection of the tongue from the caster-wheel yoke to the front end of the reach, or *vice versa*, substantially as set forth.

I also claim combining the thrust bar of a harvesting machine with the machine by means of an adjustable pivot bearing, substantially as set forth.

I also claim the combination of the driver's seat with the machine by means of an adjustable seat standard connected at its foot with the frame, in such manner that the seat can be adjusted by varying the connection of the foot of the standard, as described.

I also claim the combination of the driver's seat with its support by means of an adjustable brace and spring, substantially as set forth.

I also claim the combination of the driver's foot-board, with its support, by means of an adjustable brace, substantially as set forth.

I also claim the device herein described, for imparting two different speeds to the sickle of a harvester, consisting of the combination of a double-rimmed cog wheel upon one of the shafts of the gearing, with two pinions which are connected with the next shaft, in such a manner that one is fastened to the shaft while the other runs loose upon it, and *vice versa*, substantially as set forth.

I also claim the combination of a finger-beam of plate metal bent into a trough form with a wood filling in the hollow of the trough, substantially as set forth.

I also claim constructing the finger beam with a recess in which the crank of the sickle can revolve, so that the sickle can be withdrawn past the face of the crank without displacing the crank, substantially as set forth,

I also claim the combination of the raking platform of a harvester with a tipping or hinged dumping box whose bottom is not above the level of the adjacent part of the raking platform, and which is also skewed sidewise, so that the cut grain can be discharged from the platform directly into said dumping box and can be dropped therefrom, butt downward, at the side of the track of the sickle, so as to be entirely out of the way of the machine and the horses when cutting the next swath, substantially as set forth.

I also claim the combination of a tipping dumping box with a driver's seat, located sufficiently behind the finger beam to permit the driver supported thereon to rake the grain from the raking platform, and drop it upon the ground, substantially as described.

39,527.—Steam-engine Cylinder.—S. D. Gilson, Syracuse, N. Y., assignor to himself and Joseph Hall, Rochester, N. Y.:

I claim providing the inner surface of steam cylinders with several annular channels, c, or their equivalents, in combination with the piston head, D, substantially as and for the purposes specified.

39,528.—Cultivator.—C. W. S. Heaton (assignor to J. J. Piggott), Salem, Ill.:

Jclaim, first, The arrangement in a cultivator of the brace rods, h h, and stay rod, k, in such manner that the longitudinal strain upon the implement shall be thrown upon the side beams, B B, and front beam, C, when the implement is unobstructed by stones, &c, but when the implement is obstructed by stones, &c., the sudden jar, due upon the tongue, A, shall be relieved by the oblong slot, c, and finally be sustained by the stay rod, k, all substantially in the manner set forth.

Second, The arrangement, in a cultivator, of the automatically shifting brace rods, h h, pin, d, and vertical slot, c, in the manner and for the purposes described.

Third, The arrangement of the inclined stay rod, k, beam, C, and tongue, A, substantially as and for the purpose set forth.

Fourth, A cultivator combining in its construction the tongue, A, side beams, B B, upper and under slotted cross beams, C C′, V-shaped adjustable braces or stocks, E E′, brace rods, h h, and stay rod, k, the several parts being constructed and arranged as described.

39,529.—Churn.—Egbert Hinman, Syracuse, N. Y., assignor to John Rankin, Homer, N. Y.:

I claim the employment of the preliminary dasher, a, constructed as described, in combination with the case, b, provided with a register for varying the capacity of the discharge apertures, the whole arranged and operating as set forth.

I also claim regulating the capacity of the apertures through which the liquid and solid mass escapes from the case, b, as and for the purpose described.

I also claim making the driving gear, E, adjustable in its shaft, as described, in combination with the clutching device, or its equivalent, whereby the driving gear may be adjusted to run in mesh with either one or both of the dasher pinions, as and for the purposes set forth.

39,530.—Steam Boiler.—T. T. Prosser (assignor to himself and M. C. and K. A. Darling), Fond du Lac, Wis-Ante-dated Jan. 31, 1863:

I claim, first, The application of the exhaust steam of the engine to the boiler for the purpose and in the manner set forth.

Second, The combination of the chamber, A A′ A″ A‴, and the inclosed tubes or flues, with the exhaust pipe or pipes of the engines in the manner and for the purpose set forth.

39,531.—Process of Uniting Iron and Steel with Copper. Brass, &c.—Richard Savary (assignor to himself and R. C. Totten), Pittsburgh, Pa.:

I claim uniting pieces of iron, whether cast, wrought or steel, with copper, brass, bronze, or other alloys of copper, by casting one metal on to a solid piece of the other, having interposed between the surfaces to be thus united, a flux composed of the ingredients hereinbefore described, or their equivalents.

39,532.—Machinery for Operating Churns.—J. J. Taylor, Attica, Ind., assignor to himself and E. F. Giles, Washington, D. C.:

I claim a portable lid that shall contain within its interior, all the machinery and power to operate a churn-dash, automatically, when constructed and operated substantially as described and set forth in the accompanying drawings and specifications.

39,533.—Car Axle.—C. D. Tisdale (assignor to C. D. and B. W. Tisdale, and M. B. Boynton), East Boston, Mass.:

I claim my improved arrangement and application of the wheels, their sleeve, axle and stuffing boxes, substantially in the manner as described.

39,534.—Manufacturing Flesh Hooks and Forks.—M. V. Trask (assignor to Parker & Perkins), Meriden, Conn.:

I claim, first, Casting in one piece with the tines, A, and shank, B, of a flesh-hook or fork, a hollow handle, C, substantially as and for the purpose described.

Second, Casting the handle, C, and shank, B, in one piece, and after the metal is rendered malleable, giving said shank a quarter twist, so as to bring the flat, broad part of said handle parallel with a line passing through the points of the tines, A, substantially as set forth and for the purpose described.

39,535.—Coal Stove.—J. G. Treadwell and William Hailes (assignors to M. L. Mead and Wm. Hailes), Albany, N. Y.:

First, We claim the combination of the illumination openings, flame-expansion chamber, coal-supply reservoir, fire-pot, descending flue and draft flue, substantially in the manner and for the purpose described.

Second, The combination with the flame-expansion chamber, formed at the base of the coal-supply reservoir, and around the upper edge of the fire-pot of a base-burning stove, of the branch draft flue with damper, when the same are located with respect to the flame-expansion chamber, fire-pot, coal-supply reservoir, and descending combustion flues, substantially as and for the purpose described.

Third, A fire-brick or fire-proof throat, for a coal-supply reservoir of base-burning stoves, when such throat is wholly free, so far as expansion and contraction are concerned, from the different parts of the stove, and is loosely set upon that portion which sustains it in place, and is constructed of encircling rings of metal and fire-brick or other fire-proof substance, substantially as described.

Fourth, The branch to the poke-hole, substantially as and for the purpose described.

Fifth, The portable auxiliary grate, constructed and adapted as specified, for use with base-burning reservoir stoves, in the manner and for the purpose set forth.

Sixth, Providing the ash pan with unobstructed holes in its sides, about midway of its length, for the purpose set forth, and so that side handles or a bale which is permanently attached and liable to become heated, may be dispensed with.

39,536.—Plow.—G. W. N. Yost, Nashville, Tenn., assignor to himself and William Dilworth, Jr., of Pittsburgh, Pa.:

I claim, first, The wrought-iron standard holders, A B, constructed and arranged as described, in combination with the beam, C.

Second, The combination and arrangement of the standards, D E, with the standard holders, A B, and beam, C.

39,537.—Double Plow.—G. W. F. Yost, Nashville, Tenn., assignor to himself and William Dilworth, Jr., of Pittsburgh, Pa.:

I claim, first, The construction and arrangement of the wrought-iron standard holders, A B, in combination with the beam, O, of the plow, substantially as herein set forth and described.

Second, The combination and arrangement of the plow standards, C D, with the beam of the plow operating so as to turn two furrows wide or two furrows deep, substantially as herein set forth.

39,538.—Dental Plate.—J. A. McClelland, Louisville, Ky.:

I claim, first, The employment or use of a metallic dental plate closely perforated or woven, so that india-rubber may penetrate and adhere to it, as described.

Second, The combination in a dental plate of a skeleton or plate of woven or perforated metal with a base or filling of vulcanized india-rubber, in order to unite the perfect adaptability of rubber to the mouth, with the strength of metal, substantially as explained.

[This invention consists in the employment, in connection with vulcanized rubber as a base for artificial dentures, of a skeleton composed of reticulated or perforated metal, the object being to produce a plate possessing the requisite strength, without making it so thick and clumsy as is unavoidable when the plate is composed entirely of vulcanized india-rubber.]

RE-ISSUE.

1,519.—Grain Separator.—J. B. Barcelo, Tuscarora, N. Y. Patented Dec. 9, 1862:

I claim the vertically-adjusting screen, B, having projecting bearings, c c, when arranged in combination with the shoe, A, and its gains, d d, in such a manner that the screen can be applied to any ordinary mill without special adaptation, said screen being adjusted relatively to the blast, by means of the rod and nut, f g, or equivalent, the whole arranged and operating substantially as herein set forth.

In combination with the vertically-adjusting screen, B, I also claim the longitudinally-adjusting discharge board, C, substantially as herein described.

1,520.—Horse-rake.—Conrad Furst, David Bradley, and John Lacey, Chicago, Ill. Patented April 15, 1862:

We claim, first, The slide and socket, M and P, arranged in combination with a rake head and axle, substantially as and for the purposes specified.

Second, The combination of the lever, A, connecting bar, B, front pad or pin, o, and the treadle, c, with the rake head, substantially as set forth and specified.

1,521.—Grate for Stoves.—William Hailes, Albany, N. Y. Patented Nov. 18, 1862:

I claim, first, A grate having varying openings or spaces extending from or about the center thereof to the circumference or rim, when constructed substantially as shown in figure 1, with a series of long and short projections, a b, running toward its center, substantially as described.

Second, In combination with the above I claim the projections, a′ a′, on the circumference, all for the purpose herein described.

Third, Casting a grate with the tongue portion, B, forming an extension of the rim of the grate, and constituting the means whereby the grate can be vibrated, substantially as described.

Fourth, The supporting bar for the grate when constructed with the vertical segmental slot, D, through it, for receiving and allowing a free circular play to be given to the tongue, B, and also to the grate of which this tongue forms a part, substantially as described.

Fifth, The curved tongue portion, B, formed on the grate, in combination with the vertically slouted segmental portion, D, formed on the rocking bar, operating substantially as and for the purposes described.

1,522.—Buckle.—Frederick Stevens, New York City, assignee of Luther Fogg, Boston, Mass. Patented June 2, 1863:

I claim, first, The curved frame, a a, swinging on its axis, h, at or near its centers, provided with stops, i i, and with the anterior front, b′, beveled, all as set forth.

Second, The grooved tongue, e, with its lugs, f f, working on its own axis, g, and furnished with the axis, h, upon which the curved frame, a a, is hinged, all as set forth.

Third, The shank, k, when rigidly attached to the strap, in combination with and hinged to the posterior bar, q, of the tongue, e, substantially as described.

Fourth, The combination of the curved frame, a a, with its stops, i i, and beveled front, b′, with the grooved tongue, e, and its lugs, f f, and the rigidly attached shank, k, substantially as set forth.

DESIGNS.

1,806 to 1,816.—Carpet Patterns.—E. J. Ney, Lowell, Mass., assignor to the Lowell Manufacturing Company.

EXTENSIONS.

Movable Breech for Fire-arms and Appurtenances for the same.—Benjamin Chambers, Washington, D. C. Patented July 31, 1849. Re-issued April 19, 1853:

I claim, in combination with a hinged breech piece, the support, G, the slot, Y, and lever, L, whereby the said breech piece is easily moved into and out of place in closing and opening the gun for the purpose of loading, swabbing, &c., substantially as described.

I also claim, in combination with a gun having a dissected screw breech, the flanged shield through which the cartridge is made to pass into the chamber over the dissected screw, without danger of being broken by the ends and edges of threads, as herein set forth.

I also claim, in combination with a rammer for charging guns at the breech, the projecting central point, n, whereby the cartridge, in being driven to its place in the chamber, is perforated at its base, to receive the point of the percussion cap, herein described, for the purpose of insuring the ignition of the gunpowder, as set forth.

I claim the enlargement, x, near the shoulder, s′, of the rammer, whereby the shield through which the cartridge has been rammed, is made to adhere by friction to the rammer, and to be drawn out of the breech of the gun, without requiring a separate operation for taking it out. And I wish it to be understood that in these claims I shall not confine myself to the exact arrangement of parts herein described but shall vary the same at pleasure while I attain the same ends means substantially the same.

Method of Regulating the Contraction of Car Wheels.—Mary Murphy, administratrix of John Murphy, deceased, Philadelphia, Pa. Patented Aug. 7, 1849:

I claim the mode of cooling and thereby regulating the contraction of chilled railroad car and other wheels and pulleys with solid hubs, by the application of a stream of cold air to the hub, in the manner above described, in combination with the non-conducting case for retarding the cooling of the rim, as herein set forth.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is perserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

IMPORTANT TO INVENTORS

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of

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MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park ow, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

Notes and Queries

S. G., of N. Y.—The culture of fish has not been prosecuted, so far as we know, in any part of our country. There are rivers in New Jersey, New York and the Eastern States which once teemed with salmon, but in which none of this fish have been taken for thirty years. We believe that such rivers could again be stocked with this excellent fish.

W. B. R., of Mass.—You can make brass of different degrees in quality, according to the quantities of zinc and copper employed. About 65 per cent of zinc, to 35 of copper makes very good brass. White lead is a carbonate, and is formed by submitting thin sheet lead rolled in cones, to the vapor of acetic acid.

H. W., of Conn.—No mordant is required for dyeing silk and wool with aniline colors. You have simply to clean the silk or wool well, then handle it in a warm solution of aniline color dissolved in alcohol.

T. Y. B., of Pa.—If castings of good pig iron be heated to a low cherry red temperature, and then plunged in oil, they will become much tougher, and their strength will be increased about forty per cent.

J. R., of Ohio.—In preparing the juice of your sorghum for boiling, to obtain sugar, mix a small quantity of lime-water with it as soon as it is pressed from the cane. Maple sugar used with the juice of currants and berries makes a superior flavored wine to juice treated with cane sugar. If you have plenty of maple sugar we advise you to use it in preference to cane sugar in making your blackberry and elderberry wines.

J. B. L., of Ind.—Glass for windows, is colored by two different modes. The beautiful stained glass used in cathedrals, is made by fusing coloring agents with it. Painted glass for windows is produced by mixing pigments with a clear varnish—such as is made with Canadian balsam. Very little colored glass should be employed for the windows of churches, or other buildings; as it obstructs the passage of pure white light. We should advise you to get a bell of pure bell-metal (copper and tin), in preference to one of any other alloy.

H. A. W., of Vt.—The bill which was introduced last year into the Canadian legislature, containing the provision for permitting American citizens to secure patents in Canada, did not pass. Several illustrated works on stair-building have been published. You should examine them for your own satisfaction; before deciding which to purchase.

T. M., of R. I.—The natives of Madagascar used just such a bellows in 1838, as the one you propose; you will perceive then that it is not new.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Aug. 12, to Wednesday, August 19, 1863:—

E. C., of N. Y., $164; J. W. R., of Conn., $16; N. T., of Ohio, $16; J. T. C., of Iowa, $15; L. K., of N. Y., $16; A. M. B., of Mich., $15; J. J. K., of Ill., $25; C. F. B., of Conn., $12; W. P. C., of Cal., $20; H. S. W., of Mich., $25; E. S. S., of Sweden $20; W. R., of N. Y., $15; T. B., of Ohio, $15; T. J. V., of Conn., 315; A. H., of Ill., $26; B. & B. of Ill., 25; S, W., of N. Y., $30; O. F. H., of Mass., $41; W. H. J., of —— $75; S. & G., of C. W., $506; D. J. S., of N. Y., $16; D. S. E., of Mass., $20; H. K., of N. Y., $45; J. D. P., of N. J., $20; J. D., of N. J., $45; R. B., of N. Y., $45; D. C., of N. Y., $30; N. H., of N. Y., $20; V. G., of N. Y., 16; D. C., of N. Y., $30; J. W. T., of Vt., $20; J. S. T., of Cal., $41; M. B. W., of Conn., $16; S. W. N., of N. $25; G. W. L., of Ohio, $15; D. C. M., of N. T., $20; C. E. M., of Vt., $15; J. B., of Ohio, 16; G. F. C., of Mass., $15; N. C. S., of Conn, $25; A. A. S., of Mich, $25; B. & C., of R. I., 73; J. T., of W's., $20; C. E. S., of Conn., 20; L. S., of N. Y., $16; N F. C., of Wis., $20; T. W., of Mass., $20; O. & F., of N, Y., $16; A. & W., of N. Y., $20; W. S. W., of N. Y. 20; G. H. S., of Mass., $20; H. D., W., of Mass., $20; J. B., of N. Y., $20; J. M. M., of Mass., $25; A. L. F., of Pa., $55; G. P., of N. Y., $64; N. S., of Ind., $20; J. D. B., of Vt., $20; A. B., of N. Y., $20; R. L., of N. Y., $16; J. D. W. W., of N. Y., $20; C. D. B., of Mich, $20; J. P., of N. Y., $145; L. A. J., of Cal., $20; M. E., of Ill., 20.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, August 12, to Wednesday, August 19, 1863:—

C. F. B., of Conn.; J. W. McL., of Ohio; A. A. S., of Mich.; J. J. K., of Ill.; N. C. S., of Conn.; B. & B., of Mo.; S. P. La D., of Iowa; W. W. T., of Wis.; H. W., of Pa.; A. H., of Ill.; S. W. N., of N. Y.; J. L. K., of N. J.; B. & C., of R. I. (3 cases); S. W., of N. Y.; H. B. of Pa.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement hey may deem objectionable.

TO PRACTICAL BOLT AND NUT-MAKERS.—WANTED, a steady, reliable man who has had practical experience in making pressed bolts and nuts. A good situation, with prospect advancement, will be assured. Address, stating terms and full particulars, B. D. H., Box 447, Pittsburgh, Pa. 7 4*

THE PRACTICAL DRAUGHTSMAN'S BOOK OF INDUSTRIAL DESIGN. Just published and now ready for delivery. "The Practical Draughtsman's Book of Industrial Design, and Machinist's and Engineer's Drawing Companion;" forming a complete course of Mechanical Engineering and Architectural Drawing. From the French of M. Armengaud the elder, Professor of Design in the Conservatoire of Arts and Industry, Paris, and MM. Armengaud the younger and Amouroux, Civil Engineers. Re-written and arranged, with additional matter and plates, selections from and examples of the most useful and generally employed mechanism of the day. By William Johnson, Assoc. Inst. C. E., editor of *The Practical Mechanic's Journal*. Illustrated by 50 folio steel plates, and 50 wood cuts. 4to., $7·50.

Among the contents are:—*Linear Drawings, Definitions and Problems:* Plate I.; Applications, Designs for Inlaid Pavements, Ceilings and Balconies: Plate II.; Sweeps, Sections and Mouldings; Plate III.; Elementary Gothic Forms and Rosettes; Plate IV; Ovals, Ellipses, Parabolas and Volutes; Plate V.; Rules and Practical Data; *Study of Projections:* Elementary Principles; Plate VI. Of Prisms and other Solids; Plate VII.; Rules and Practical Data; *On Coloring Sections with Applications*—Conventional colors, Composition or mixture of Colors; Plate X.; *Continuation of the Study of Projections*—Use of sections—details of machinery; Plate XI.; Simple applications—spindles shafts, couplings, wooden patterns; Plate XII.; Method of constructing a wooden model or pattern of a coupling, Elementary applications—rails and chairs for railways; Plate XIII; *Rules and Practical Data:* Strength of material, Resistance to compression or crushing force; Tensional resistance, Resistance to flexure, Resistance to torsion Friction of surfaces in contact.

THE INTERSECTION AND DEVELOPMENT OF SURFACES, WITH APPLICATIONS.—*The Intersection of Cylinders and Cones:* Plate XIV.—*The Delineation and Development of Helices, Screws and Serpentines:* Plate XV., Application of the helix—the construction of a staircase: Plate XVI., The intersection of surfaces—applications to stop-cocks; Plate XVII; *Rules and Practical Data*, Steam, Unity of heat, Heating surface, Calculation of the dimensions of boilers, Dimensions of fire grates, Chimneys, Safety-valves.

THE STUDY AND CONSTRUCTION OF TOOTHED GEAR—Involute, cycloid and epicycloid: Plates XVIII. and XIX., Involute: Fig 1, Plate XVIII., Cycloid; Fig. 2, Plate XVIII. External epicycloid described by a circle rolling about a fixed circle inside it; Fig 3, Plate XIX Internal epicycloid; Fig. 2, Plate XIX. Delineation of a rack and pinion in gear; Fig 4, Plate XVIII. Gearing of a worm with a worm-wheel; Fig 5 and 6, Plate XVIII.; *Cylindrical or Spur Gearing:* Plate XIX. Practical delineation of a couple of spur-wheels: Plate XX.; *The Delineateon and Construction of Wooden Patterns for Toothed Wheels:* Plate XXI.; *Rules and Practical Data:* Toothed gearing, Angular and circumierential velocity of wheels, Dimensions of gearing, Thickness of the teeth, Pitch of the teeth, Dimensions of the web, Number and dimensions of the arms, Wooden patterns.

CONTINUATION OF THE STUDY OF TOOTHED GEAR—Design for a pair of bevel-wheels in gear: Plate XXII. Construction of wooden patterns for a pair of bevel-wheels: Plate XXIII.; *Involute and Helical Teeth:* Plate XXIV.—*Contrivances for obtaining Differential Movements*, The delineation of eccentrics and cams: Plate XXV.; *Rules and Practical Data:* Mechanical work of effect. The simple machines, Centre of gravity. On estimating the power of prime movers, Calculation for the brake, The fall of bodies, Momentum, Central forces.

ELEMENTARY PRINCIPLES OF SHADOWS—*Shadows of Prisms, Pyramids and Cylinders:* Plate XXVI.; *Principles of Shading:* Plate XXVII.; *Continuation of the Study of Shadows:* Plate XXVIII. *Tuscan Order:* Plate XXIX; *Rules and Practical Data:* Pumps, Hydrostatic principles, Forcing pumps; Lifting and forcing pumps, The hydrostatic press, Hydrostatical calculations and data—discharge of water through different orifices, Gaging of a water-course of uniform section and fall. Velocity of the bottom of water-courses, Calculation of the discharge of water through rectangular orifices of narrow edges. Calculation of the discharge of water through overshot outlets. To determine the width of an overshot outlet, To determine the depth of the outlet, Outlet with a spout or duct.

APPLICATION OF SHADOWS TO TOOTHED GEAR: Plate XXX.—*Application of Shadows to Screws:* Plate XXXI.; *Application of Shadows to a Boiler and its Furnace:* Plate XXXII.; *Shading in Black—Shading in Colors:* Plate XXXIII.

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THE STUDY OF MACHINERY AND SKETCHING.—Various applications and combinations: *The Sketching of Machinery:* Plate XXXV. and XXXVI.; *Drilling Machine; Motive Machines;* Water wheels, Construction and setting-up of water wheels, Delineation of water wheels, Design for a water wheel, Sketch of a water wheel; *Overshot Water Wheels; Water Pumps;* Plate XXXVII; *Steam Motors;* High-pressure expansive steam engine: Plates XXXVIII., XXXIX. and XL.; *Details of Construction; Movements of the Destribution and Expansion Valves; Rules and Practical Data*, Steam engines: low-pressure condensing engines without expansion valve. Diameter of piston, Velocities, Steam pipes and passages, Air-pump and condenser. Cold-water and feed-pumps, High-pressure expansive engines, Medium pressure condensing and expansive steam engine. Conical pendulum or centrifugal governor.

OBLIQUE PROJECTIONS.—Application of rules to the delineation of an oscillating cylinder: Plate XLI.

PARALLEL PERSPECTIVE.—Principles and applications: Plate XLII.

TRUE PERSPECTIVE.—Elementary principles: Plate XLIII., Applications—flour mill driven by belts: Plate XLIV. and XLV., Description of the mill. Representation of the mill in perspective. Notes of recent improvements in flour mills, Schiele's mill, Mullin's "ring millstone." Barnett's millstone, Hastie's arrangement for driving mills, Currie's improvements in millstones; *Rules and Practical Data*, Work performed by various machines, Flour mills, Saw mills, Veneer-sawing machines, Circular saws.

EXAMPLES OF FINISHED DRAWINGS OF MACHINERY.—Plate A, balance water-meter; Plate B, engineer's shaping machine; Plate C D E, express locomotive engine; Plate F, wood planing machine; Plate G, washing machine for piece goods; Plate H, power loom; Plate I, duplex steam boiler; Plate J, direct-acting marine engines.

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THE "WASHINGTON" AERIAL NAVIGATION COMPANY.—Wanted to organize an Aerial Navigation Company, to run around the Globe in an easterly direction, between the latitude of 30° and 60° north; delivering and receiving mails at the chief city of each State on the line of travel. Capital stock $1,000,000; shares $1,000 each. We will commence operations with a capital of $100,000, and continue in partnership during the continuance of my patent; for the use of which I will receive 20 per cent of the entire profit. Gentlemen desiring to engage in this grand enterprize can purchase shares by sending me their addresses, and one-tenth of the price of all the shares they may wish to purchase. I will officiate as President of the Company until 100 shares have been purchased; I will then proceed to New York, and call a meeting of shareholders, and have a competent set of officers elected. All company money received by me will be entered in a book kept for the purpose, and published, from time to time, in the SCIENTIFIC AMERICAN. Persons wishing to build an Aerial machine for pleasure can obtain a license by the year, at 5 cents per cubic yard, by addressing ARTHUR KINSELL, Cascades, Washington Territory. [See engraving and description in another column.] 1

R. J. IVES, BRISTOL, CONN., MANUFACTURES all kinds of machine and fancy screws. Address as above.
6 10*

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OFFICE OF THE SIGNAL OFFICER,

WASHINGTON, D. C., Aug. 8, 1863.

Sealed Proposals will be received at this office until SATURDAY, August 29, 1863, at 4 o'clock, P. M., for furnishing for the Signal Department the following articles :—

250 Two hundred and fifty sets Signal Equipments.
30 Thirty barrels Turpentine.
100 One hundred bales Wicking.
200 Two hundred Telescope Holders.
25 Twenty-five gross Wind Matches.
20 Twenty pounds Linen Thread.
2 Two gross Needles.
10 Ten Tap Boxers.
20 Twenty Spigots.

The first delivery to be made about the 15th of September, 1863, or as soon thereafter as Government may direct.

The full name and Post-Office address of the bidder must appear in the proposal.

If a bid is made in the name of a firm, the names of all the parties must appear, or the bid will be considered as the individual proposal of the party signing it.

Proposals from disloyal parties, or where the bidder is not present to respond to his bid, will not be considered.

Proposals must be addressed to "The Signal Officer of the Army," Washington, D. C., and should be plainly indorsed, "Proposals for Field Signal Equipments."

The responsibility of the guarantors must be shown by the official certificate of the clerk of the nearest district court or of the United States District Attorney.

The ability of the bidder to fill the contract, should it be awarded to him, must be guaranteed by two responsible persons, whose signatures are to be appended to the guarantee, *and said guarantee must accompany the bid.*

Bonds in sums of double the amount involved in the contracts, signed by the contractor and both of his guarantors, will be required of the successful bidder or bidders, upon signing the contract.

FORM OF GUARANTEE.

We ——, of the county of ——, and State of ——, do hereby guarantee that —— is able to fulfill the contract in accordance with the terms of his proposition, and that should his proposition be accepted he will at once enter into a contract in accordance therewith.

Should the contract be awarded to him we are prepared to become his securities.

(To this guarantee must be appended the official certificate above mentioned.)

The right is reserved to reject all proposals, if the prices are deemed too high, or if, for any cause, it is not deemed for the public interest to accept them.

Models will be on exhibition at the office of the Signal Officer for twenty (20) days from date. 8 3

PROPOSALS FOR CONSTRUCTING A BRICK TUNnel under Lake Michigan, two miles long, for the City of Chicago

OFFICE OF THE BOARD OF PUBLIC WORKS,
CHICAGO, August 13th, 1863.

Sealed Proposals will be received at this office till Wednesday, September 9th, at 11 o'clock, a. m., at which time the Board will open the same, for doing all the work and furnishing all the materials required for the construction of a brick tunnel, five feet clear diameter, and extending from the present pumping works of the city, two miles out under the bed of Lake Michigan, and through what numerous borings invariably show to be a stiff blue clay soil, together with land and lake shafts, and protecting cribs, in accordance with the plans and specifications for the doing of said work, to be found on file in the office of this Board on and after the 19th inst.

The Board would prefer to let the entire work to one contractor or company, but will receive separate proposals for the tunnel proper and land shaft, for the protecting cribs, and for the cast-iron cylinders for lake shafts.

The Board reserves the right to reject any or all bids, and to accept any one bid complying with the conditions of this advertisement.

The bids must be sealed, and must be accompanied with a bond of the penal amount of $200, blanks for which will accompany the specifications, guaranteeing the execution of a contract in accordance with the bid, in case the bid is accepted.

Proposals must be directed to the Board of Public Works, and indorsed "Proposals for Lake Tunnel."

Satisfactory security for the faithful performance of the work will be required of the parties whose bids may be accepted.

J. G. GINDELE,
FRED LETZ,
F. C. SHERMAN,
Board of Public Works.

9 2

BLUES AND CARMINES OF INDIGO.—JUST PUBLISHED, Blues and Carmines of Indigo. A Practical Treatise on the Fabrication of every Commercial Product derived from Indigo. By Felicien Capron de Dole. Translated from the French, with extensive and important additions, by Prof. H. Dussance. In one volume, 12mo. Price $2·50.

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TO STEAMSHIP AND STEAMBOAT OWNERS AND BUILDERS.—For sale—Two Low-pressure Beam Engines—one 11-feet stroke and 72-inch bore cylinder, and the other a double cylinder engine, formerly used in the steamer *Buckeye State*, on Lake Erie. The outside cylinder is 81-inch bore, and the inside cylinder 36-inch bore and 12 feet stroke, and was, when in use, remarkable for its great economy in fuel. Both engines are in good order. For further particulars or information address E. B. WARD, Detroit, Michigan. 8 4*

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TO BRIDGE BUILDERS.—THE FRANKLIN AND Allegheny Bridge Company will receive proposals for rebuilding the Superstructure of their Bridge—four spans, 180 feet each—until 10th September. Bidders will furnish plans and specifications. Wire suspension preferred. C. HEYDRICK, Secretary, Franklin, Pa. 8 2*

TO INVENTORS WHO HAVE INVENTIONS OF practical value, either patented or not, and who have not sufficient capital to bring the same out, by addressing the subscriber may be assisted in so doing, or the right to manufacture be purchased. Describe the article in full, with simple drawings, if convenient, mentioning advantages, &c. Address, by mail, D. B. WHIPPLE, New Haven, Conn. 8 2*

A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

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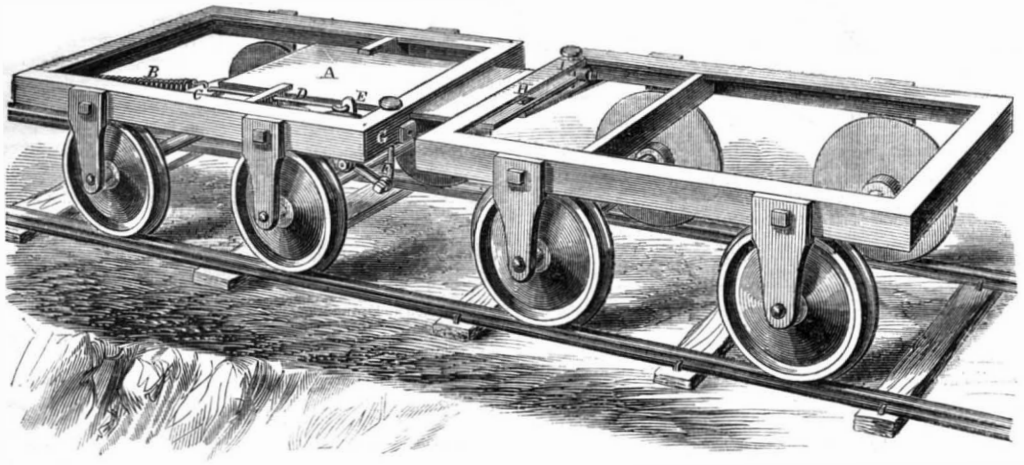
Improved Railroad Car.

It is well known that very many accidents have occurred from persons passing from one car to another on a railway train, when the latter is in rapid motion. In stepping across the intervening space, many have lost their footing, and fallen through to the track below. The engraving published herewith, is an illustration of a sliding platform, working at will, so as to bridge over the space between the cars, and enable the traveller to pass safely from one to the other. The following description will enable

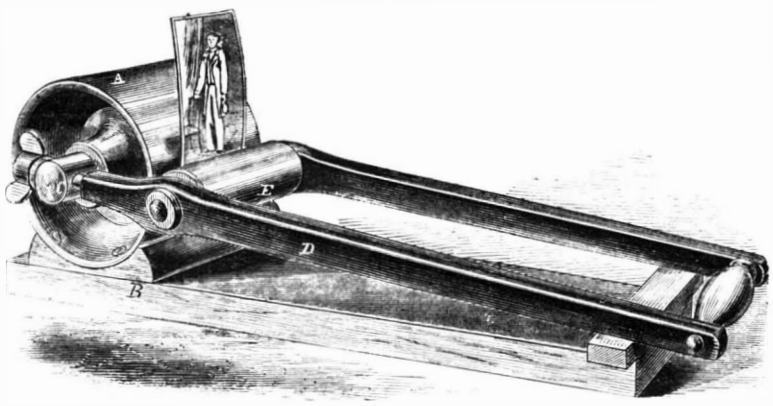


HOLCROFT AND SMITH'S PATENT CAR.

every one to understand the working of this apparatus :—The floors of the cars, and all other parts, are removed, in order to show the invention more clearly. The plate A slides in a slot in the end of the car frame and between guides set in the same ; it has a spiral spring, B, attached to the back of it. This spring is fastened to an arm C, that is jointed to one side of the frame ; in the arm the link D is hooked, the other end proceeding to a right-angled lever, E, vibrating on a pin attached to a hanger ; to the other end of this lever, the treadle-rod F is jointed, and proceeds thence upward through the timber G. In the plate A is a square hole, which takes a catch, H, in the end of the platform of the adjoining car ; the edge of this spring being bevelled off, so that the plate will shoot into it, and drop into its place ; the catch is also released by pressing on the treadle I, when the bridge or sliding-plate A flies back to its place, drawn in by the spring before mentioned. The operation of this device is as follows :—By pressing on the treadle F, the plate is thrown forward, and hooks over the catch ; the passenger may then move over with safety ; on reaching the next car, a downward pressure on the treadle I releases the plate, which flies back to its former position, as before set forth. This invention was patented, through the Scientific American Patent Agency, by Holcroft and Smith, on June 2, 1863. For further information, address them at Chester Valley, Pa.

Improved Photographic Press.

Few are aware to what an extent the art of photography has benefitted the industrial interests of the community. The chemist, the glass blowers the paper makers, painters, bookbinders, machinists, and many other trades have an interest in the wonderful art. The albumen used on the photographic



SELLERS'S PHOTOGRAPHIC PRESS.

card gives a certain amount of gloss ; but the texture of the paper, and the long washing and soaking of the prints, makes the surface even, and prevents the picture from being seen in all its perfection of detail. To render them smooth, it is customary after being mounted on card board, to roll them between polished steel rollers, or between polished steel plates and rollers. Many very excellent machines have been made for this purpose ; but we now desire to call attention to a press which is being manufactured and sold very extensively by the Messrs. E. & H. T. Anthony, of 501 Broadway, of this city. This press of which the accompanying engraving is an illustration, is the invention of Mr. Coleman Sellers, of Philadelphia ; and was patented by him July 29, 1862. It is designed with reference to cheapness, and durability of construction, with excellence of work produced. It consists of a cylinder of cast-iron, A, which is bolted to a wooden base, B ; through the center of this cylinder passes a shaft, C, somewhat longer than the cylinder. Through the projecting ends of this shaft are bored parallel holes, to receive the screwed ends of two radius bars or arms, D. These arms serve to carry a small highly polished steel roller, F, the journals of which are carried in holes in the bars, D ; these holes are bushed with raw hide, so as to prevent their cutting for want of oil. The outer ends of the bars, D, are united by the handle, and the screwed ends passing through the center shaft have thumb nuts, to enable the steel roller to be drawn down against the cast-iron cylinder, and ad justed to the pressure suited to the work to be rolled or pressed. It is evident that as the large cylinder cannot revolve, being fastened to the base board, the small steel roller can only be caused to roll around a portion of its circumference, and the diameter of the cast-iron cylinder must be of such a size as to allow of the portion of its circumference utilized by the small roller in its vibration to be longer than the card or picture to be pressed. Thus, in the small machine used for card pictures, the cylinder is 4 inches wide on the face and 4½ inches in diameter, which permits the rolling of stereoscopic pictures as well as cards ; as it will roll a card 3¾ inches wide by 7 inches long. Upon the large cylinder is a flattened place under the small roller, when it is down as close to the base board as the handle will permit, this is to facilitate the entrance of the card. In use, the roller having been adjusted to the proper pressure by experiment, the cards are inserted with the face towards the small roller. Thus as the steel roller is pulled forward over the picture by its handle, the card vibrates with it, remaining at all times tangental to the large cylinder, and the actual operation of the machine is similar to the rolling of a garden roller over the grass, the center being continually carried forward. It is needless to comment on the simplicity of this little machine ; its rapid sale testifies to its excellence. These machines are manufactured exclusively by Messrs. E. & H. T. Anthony, 501 Broadway, New York, to whom all orders must be addressed.

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FROM THE STEAM PRESS OF JOHN A GRAY

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